



**Department of
Design and
Construction**

**CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS
VOLUME 1 – BID BOOKLET
SINGLE PLA CONTRACT VERSION**

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Introduction

This Bid Booklet is intended to provide general information necessary for bidding on a DDC public works project and is part of the Contract Documents, as per Article 1.1 of the Standard Construction Contract.

As this contract is solicited via the PASSPort system, the bidder will be required to complete all of the PASSPort forms and questionnaires. These forms and questionnaires, along with the bidder's responses, will become part of the Bid Booklet.

Additional information on the PASSPort system can be found at the following website:

<https://www1.nyc.gov/site/mocs/systems/passport-user-materials.page>

Bid Submission Requirements

THE FOLLOWING MUST BE COMPLETED AND SUBMITTED FOR THE BID TO BE CONSIDERED RESPONSIVE:

1. Completed electronic bid submission in PASSPort;
 - a. All required fields in PASSPort must be completed.
2. One-page signed Bid Submission Form delivered in person to DDC before the bid due date; and
3. Bid security, if required.
 - a. If Bid security is in a form of a bid bond, bidders must include it with their electronic PASSPort submission.
 - b. If Bid security is in a form of a certified check, bidders must deliver the certified check with the signed Bid Submission Form.

BIDDERS ARE ADVISED THAT PAPER BID SUBMISSIONS WILL BE DEEMED NON-RESPONSIVE. BIDDERS MUST SUBMIT THEIR BIDS ELECTRONICALLY IN PASSPORT, PROVIDE THE BID SECURITY, AND DELIVER TO DDC THE ONE-PAGE SIGNED BID SUBMISSION FOR THE BID TO BE CONSIDERED RESPONSIVE.

THE FOLLOWING MAY RESULT IN THE BID BEING FOUND NON-RESPONSIVE:

1. Any discrepancy between the total bid price listed on the Bid Submission Form and the bid information submitted in PASSPort.
2. Failure to upload required files or documents as part of a mandatory PASSPort Questionnaire response.
3. Uploading an incorrect file as part of a mandatory PASSPort Questionnaire response.
 - a. For clarity, this includes uploading the bid breakdown on a form other than the Excel file provided in the PASSPort Questionnaire.

Notices to Bidders

Project Labor Agreement & Single Contract

PROJECT LABOR AGREEMENT: This contract is subject to a Project Labor Agreement (“PLA”) entered into between the City and the Building and Construction Trades Council of Greater New York (“BCTC”) affiliated Local Unions. By submitting a bid, the Contractor agrees that the PLA is binding on the Contractor and all subcontractors of all tiers. The bidder to be awarded the contract will be required to execute a “Letter of Assent” prior to award.

The Bidder is advised to review the following: (1) Notice regarding the PLA, (2) the PLA, and (3) the Letter of Assent, all of which are set forth at the beginning of Volume 2 of the Contract Documents.

SINGLE CONTRACT: As stated above, this contract is subject to a PLA. The requirements of the Wicks Law for separate prime contractors DO NOT APPLY to any project that is covered by a PLA. Accordingly, the requirements of the Wicks Law for separate prime contractors do not apply to this Project. The Project consists of a single contract.

The Bidder is advised to review the Notice set forth at the beginning of Volume 2 of the Contract Documents. The Notice specifies revisions to the Contract Documents to provide that the Project consists of a single contract and to delete any and all references to separate prime contractors.

Pre Bid Questions (PBQs)

Please be advised that PBQs should be submitted to the Agency Contact Person (CSB_projectinquiries@ddc.nyc.gov) at least five (5) business days (by 5:00 PM EST) prior to the bid opening date as indicated in the PASSPort procurement.

All PBQs must reference the Project ID. If a bidder has multiple PBQs for the same Project ID, the PBQs must be numbered sequentially, even if they are submitted separately.

While the PASSPort system has a facility for submitting inquiries, bidders are directed to send PBQs as directed above instead of using the PASSPort inquiry system.

Inquiries sent using the PASSPort inquiry system will not be considered PBQs.

NYC Contract Financing Loan Fund

If your business is working as a prime or subcontractor on a project with a City agency or City-funded entity, you may be eligible for a Contract Financing Loan from a participating lender coordinated with the NYC Department of Small Business Services (SBS). Loan repayment terms align with the contract payment schedule.

For more information: Call 311 or visit <https://www1.nyc.gov/nycbusiness/article/contract-financing-loan-fund>

M/WBE Notice to Prospective Contractors

PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT (9/2020 version)

ARTICLE I. M/WBE PROGRAM

Section 6-129 of the Administrative Code of the City of New York (“Section 6-129”) establishes the program for participation in City procurement (“M/WBE Program”) by minority-owned business enterprises (“MBEs”) and women-owned business enterprises (“WBEs”), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City’s procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services (“DSBS”) promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the “M/WBE Utilization Plan”) and are detailed below. Contracts solicited through the Procurement and Sourcing Solutions Portal (PASSPort) will contain a Schedule B in the format outlined in the Schedule B – M/WBE Utilization Plan & PASSPort rider. The provisions of this notice will apply to contracts subject to the M/WBE Program established by Section 6-129 regardless of solicitation source.

The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129.

References to MBEs or WBEs shall also include such businesses certified pursuant to the executive law where credit is required by section 311 of the New York City Charter or other provision of law.

Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts.

Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD

AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

1. The **MBE and/or WBE Participation Goals** established for this Contract or Task Orders issued pursuant to this Contract, (“**Participation Goals**”), as applicable, are set forth on Schedule B, Part 1 to this Contract (see Page 1, Line 1 Total Participation Goals) or will be set forth on Schedule B, Part 1 to Task Orders issued pursuant to this Contract, as applicable.

The **Participation Goals** represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with DSBS as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If **Participation Goals** have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part 2 (see Pages 1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor's required certification and affirmations. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE **Participation Goals**, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part 2 (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified **Participation Goals** by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals** that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed non-responsive.

(ii) **Participation Goals** on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If **Participation Goals** have been established on a Task Order, a contractor shall be required to submit a Schedule B – M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part 2 (see Pages 1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor’s required certification and affirmations. The contractor must engage in good faith efforts to meet the **Participation Goals** as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART 2). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART 3). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work.** In the event that the Contractor’s selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms’ participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the

firms' commencement of work. A list of city-certified MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6451, or by visiting or writing DSBS at One Liberty Plaza, New York, New York, 10006, 11th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to, the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE** Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE** Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an **M/WBE** Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.

10. Pre-award waiver of the **Participation Goals**.

(a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the Participation Goals in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

(b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part 3 of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at MWBEModification@ddc.nyc.gov. Full or partial waiver requests that are received later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due may be rejected as untimely. Bidders, proposers, or contractors, as applicable, who have submitted timely requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an

Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the **Participation Goals** to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of

subcontracting in its **M/WBE** Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the **Participation Goals**. In making such determination, Agency may consider whether the **M/WBE** Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. Modification of **M/WBE** Utilization Plan. (a) A Contractor may request a modification of its **M/WBE** Utilization Plan after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's **M/WBE** Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

(i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;

(ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;

(iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;

(iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the **M/WBE** Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;

(v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;

(vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;

(vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;

(viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE Utilization Plan** would be awarded to subcontractors.

12. If the Contractor was required to identify in its bid or proposal the MBEs and/or WBEs they intended to use in connection with the performance of the Contract or Task Order, substitutions to the identified firms may only be made with the approval of the Agency, which shall only be given when the Contractor has proposed to use a firm that would satisfy the **Participation Goals** to the same extent as the firm previously identified, unless the Agency determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts. In making such determination, the Agency shall require evidence of the efforts listed in Section 11(a) above, as applicable, along with any other relevant factors.

13. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE Utilization Plan** and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its **M/WBE Utilization Plan**, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

15. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B

MISCELLANEOUS

1. The Contractor shall take notice that, if this solicitation requires the establishment of a **M/WBE Utilization Plan**, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE Utilization Plan**.

2. Pursuant to DSBS rules, construction contracts that include a requirement for a **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.
3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.
4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).
5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required **Participation Goals**.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.
2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any **M/WBE** Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.
3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any **M/WBE** Utilization Plan, Agency may determine that one of the following actions should be taken:
 - (a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
 - (b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
 - (c) making a finding that the Contractor is in default of the Contract;
 - (d) terminating the Contract;
 - (e) declaring the Contractor to be in breach of Contract;
 - (f) withholding payment or reimbursement;
 - (g) determining not to renew the Contract;
 - (h) assessing actual and consequential damages;

(i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;

(j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or

(k) taking any other appropriate remedy.

4. If an **M/WBE** Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its **Participation Goals** contained in its **M/WBE** Utilization Plan or the **Participation Goals** as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the **Participation Goals** and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the **Participation Goals**, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its **M/WBE** Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an **M/WBE** Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in PASSPort as caution data.

Affirmation

The Bidder affirms and declares:

1. The said bidder is of lawful age and the only one interested in this bid; and no person, firm or corporation other than hereinbefore named has any interest in this bid, or in the Contract proposed to be taken.
2. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (2) unless otherwise required by law, the prices quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (3) no attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
3. No councilman or other officer or employee or person whose salary is payable in whole or in part from the City Treasury is directly or indirectly interested in this bid, or in the supplies, materials, equipment, work or labor to which it relates, or in any of the profits thereof.
4. The bidder is not in arrears to the City of New York upon debt or contract or taxes, and is not a defaulter, as surety or otherwise, upon any obligation of the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York or State of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except as disclosed in PASSPort.
5. The bidder hereby affirms that it has paid all applicable City income, excise and other taxes for all it has conducted business activities in New York City.
6. The bidder, as an individual, or as a member, partner, director or officer of the bidder, if the same be a firm, partnership or corporation, executes this document expressly warranting and representing that should this bid be accepted by the City and the Contract awarded to him, he and his subcontractors engaged in the performance:

(1) will comply with the provisions of Section 6-108 of the Administrative Code of the City of New York and the non-discrimination provisions of Section 220a of the New York State Labor Law, as more expressly and in detail set forth in the Agreement; (2) will comply with Section 6-109 of the Administrative Code of the City of New York in relation to minimum wages and other stipulations as more expressly and in detail set forth in the Agreement; (3) have complied with the provisions of the aforesaid laws since their respective effective dates, and (4) will post notices to be furnished by the City, setting forth the requirements of the aforesaid laws in prominent and conspicuous places in each and every plant, factory, building and structure where employees engaged in the performance of the Contract can readily view it, and will continue to keep such notices posted until the supplies, materials and equipment, or work labor and services required to be furnished or rendered by the Contractor have been finally accepted by the City. In the event of any breach or violation of the foregoing, the Contractor may be subject to damages, liquidated or otherwise, cancellation of the Contract and suspension as a

bidder for a period of three years. (The words, "the bidder", "he", "his", and "him" where used shall mean the individual bidder, firm, partnership or corporation executing this bid).

7. Compliance Report

The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, (1) represents that his attention has been specifically drawn to Executive Order No. 50, dated April 25, 1980, on Equal Employment Compliance of the contract, and (2) warrants that he will comply with the provisions of Executive Order No. 50. The Employment Report must be submitted as part of the bid.

8. The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, executes this document expressly warranting that he will comply with: (1) the provision of the contract on providing records, Chapter 8.
9. By submission of this bid, the bidder certifies that it now has and will continue to have the financial capability to fully perform the work required for this contract. Any award of this contract will be made in reliance upon such certification. Upon request therefor, the bidder will submit written verification of such financial capability in a form that is acceptable to the department.
10. In accordance with Section 165 of the State Finance Law, the bidder agrees that tropical hardwoods, as defined in Section 165 of the State Finance Law, shall not be utilized in the performance of this Contract, except as the same are permitted by the foregoing provision of law.
11. The bidder has visited and examined the site of the work and has carefully examined the Contract in the form approved by the Corporation Counsel, and will execute the Contract and perform all its items, covenants and conditions, and will provide, furnish and deliver all the work, materials, supplies, tools and appliances for all labor and materials necessary or required for the hereinafter named work, all in strict conformity with the Contract, for the prices set forth in the Bid Schedule.
12. M/WBE UTILIZATION PLAN: By signing its bid, the bidder agrees to the M/WBE Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted.

I hereby:

- 1) acknowledge my understanding of the M/WBE participation requirements as set forth in this Contract and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York and the rules promulgated thereunder;
- 2) affirm that the information supplied in support of the M/WBE Utilization Plan is true and correct;
- 3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract;
- 4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and

agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.

Pre-Award Process

The bidder is advised that as part of the pre-award review of its bid, it may be required to submit the information described in Sections (A) through (D) below. If required, the bidder must submit such information within five (5) business days following receipt of notification from DDC that it is among the low bidders. Such notification from DDC will be by email and will specify the types of information which must be submitted directly to DDC.

In the event the bidder fails to submit the required information within the specified time frame, its bid may be rejected as nonresponsive.

- (A) **Project Reference Form:** If required, the bidder must complete and submit the Project Reference Form set forth in this Bid Booklet. The Project Reference Form consists of 3 parts: (1) Contracts Completed by the Bidder, (2) Contracts Currently Under Construction by the Bidder, and (3) Pending Contracts Not Yet Started by the Bidder.
- (B) **Copy of License:** If required, the bidder must submit a copy of the license under which the bidder will be performing the work. Such license must clearly show the following: (1) Name of the Licensee, (2) License Number, and (3) Expiration date of the License. A copy of the license will be required from bidders for the following contracts: Plumbing Work, Electrical Work and Asbestos Abatement.
- (C) **Financial Information:** If required, the bidder must submit the financial information described below:
 - (1) **Audited Financial Statements:** Financial statements (Balance Sheet and Income Statement) of the entity submitting the bid, as audited by an independent auditor licensed to practice as a certified public accountant (CPA). Audited financial statements for the three most recent fiscal years must be submitted. Each such financial statement must include the auditor's standard report.

If the bidder does not have audited financial statements, it must submit an affidavit attesting to the fact that the bidder does not have such statements. In addition, the bidder must submit the following documentation covering the three most recent fiscal years: signed federal tax returns, unaudited financial statements, and a "certified review letter" from a certified public accountant (CPA) verifying the unaudited financial statements.

Unless the most recent audited or unaudited financial statement was issued within ninety (90) days, the bidder must submit interim financial information that includes data on financial position and results of operation (income data) for the current fiscal year. Such information may be summarized on a monthly or quarterly basis or at other intervals.

- (2) **Schedule of Aged Accounts Receivable,** including portion due within ninety (90) days.

(D) **Project Specific Information:** If required, the bidder must submit the project specific information described below:

- (1) Statement indicating the number of years of experience the bidder has had and in what type of construction.
- (2) Resumes of all key personnel to be involved in the project, including the proposed project superintendent.
- (3) List of significant pieces of equipment expected to be used for the contract, and whether such equipment is owned or leased.
- (4) Description of work expected to be subcontracted, and to what firms, if known.
- (5) List of key material suppliers.
- (6) Preliminary bar chart time schedule
- (7) Contractor's expected means of financing the project. This should be based on the assumption that the contractor is required to finance 2X average monthly billings throughout the contract period.
- (8) Any other issues the contractor sees as impacting his ability to complete the project according to the contract.

In addition to the information described in Sections (A) through (D) above, the bidder must submit such additional information as the Commissioner may require, including without limitation, an additional bid breakdown file which is detailed to the CSI Section level, coordinated with the Contract specifications, as well as an explanation or justification for specific unit price items.

The bidder is further advised that it may be required to attend a pre-award meeting with DDC representatives. If such a meeting is convened, the bidder will be advised as to any additional material to be provided.

Project References

A. Contracts completed by the bidder

List all contracts substantially completed within the last 4 years, up to a maximum of 10, in descending order of date of substantial completion.

Project & Location	Contract Type	Contract Amount (\$000)	Date Completed	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)

B. Contracts currently under construction by the bidder

List all contracts currently under construction even if they are not similar to the contract being awarded.

Project & Location	Contract Type	Contract Amount (\$000)	Subcontracted to Others (\$000)	Uncompleted Portion (\$000)	Date Scheduled to Complete	Owner Reference & Tel. No.	Architect/ Engineer Reference & Tel. No. (if different from owner)

C. Pending contracts not yet started by the bidder

List all contracts awarded to or won by the bidder but not yet started.

Project & Location	Contract Type	Contract Amount (\$000)	Date Scheduled to Start	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)

QUALIFICATION FORM

Name of Contractor: E&A RESTORATION INC

Name of Project: NCPD TRAINING AND INTELLIGENCE POLICE ACADEMY

Location of Project: GARDEN CITY, NY

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: NASSAU COUNTY DPW JOSEPH AMERIGO

Title: PROJECT MANAGER Phone Number: 516-571-6804

Brief description of the Project completed or the Project in progress: NEW 90,000 SF
ART
STATE OF THE POLICE ACADEMY ON 7 ACRE SITE

Was the Project performed as a prime, a subcontractor or a sub-subcontractor: PRIME

Amount of Contract, Subcontract or Sub-subcontract: \$46,156,972.00

Start Date and Completion Date: 8/1/2019 - 12/1/2022

Name of Contractor: E&A RESTORATION INC

Name of Project: NASSAU COUNTY FAMILY AND MATRIMONIAL COURT PHASE II

Location of Project: MINEOLA, NY

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: NASSAU COUNTY DPW JOSEPH AMERIGO

Title: PROJECT MANAGER Phone Number: 516-571-6804

Brief description of the Project completed or the Project in progress: 360,000 SF
INTERIOR FIT OUT OF 4 STORY COURTHOUSE

Was the Project performed as a prime, a subcontractor or a sub-subcontractor: PRIME

Amount of Contract, Subcontract or Sub-subcontract: \$99,750,250.00

Start Date and Completion Date: 03/30/20 - ONGOING

CONTRACTOR'S SUMMARY OF BID BREAKDOWN FORM

Project ID: SANDBOMB
Project Name: NYPD BOMB SQUAD BUILDING
Name of the Bidder: E&A RESTORATION INC

CSI Division:	Total Cost
DIVISION 01 - GENERAL REQUIREMENTS	\$ 1,697,909.00
DIVISION 02 - EXISTING CONDITIONS	\$ 355,000.00
DIVISION 03 - CONCRETE	\$ 2,085,132.00
DIVISION 04 - MASONRY	\$ 220,000.00
DIVISION 05 - METALS	\$ 1,846,485.00
DIVISION 06 - WOOD, PLASTICS, COMPOSITES	\$ 77,220.00
DIVISION 07 - THERMAL AND MOISTURE PROTECTION	\$ 2,306,338.00
DIVISION 08 - OPENINGS	\$ 1,210,464.00
DIVISION 09 - FINISHES	\$ 900,000.00
DIVISION 10 - SPECIALTIES	\$ 101,971.00
DIVISION 11 - EQUIPMENT	
DIVISION 12 - FURNISHINGS	\$ 6,058.00
DIVISION 13 - SPECIAL CONSTRUCTION	\$ 240,000.00
DIVISION 14 - CONVEYING EQUIPMENT	\$ 473,000.00
DIVISION 21 - FIRE SUPPRESSION	\$ 304,885.00
DIVISION 22 - PLUMBING	\$ 483,000.00
DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	\$ 735,000.00
DIVISION 25 - INTEGRATED AUTOMATION	
DIVISION 26 - ELECTRICAL	\$ 2,943,000.00
DIVISION 27 - COMMUNICATIONS	INCLUDED
DIVISION 28 - ELECTRONIC SAFETY AND SECURITY	INCLUDED
DIVISION 31 - EARTHWORK	\$ 4,143,416.00
DIVISION 32 - EXTERIOR IMPROVEMENTS	\$ 271,823.00
DIVISION 33 - UTILITIES	\$ 1,000,000.00
DIVISION 34 - TRANSPORTATION	
DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION	
DIVISION 40 - PROCESS INTEGRATION	
DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT	
DIVISION 42 - PROCESS HEATING, COOLING, AND DRYING EQUIPMENT	
DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT	
DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT	
DIVISION 45 - INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT	
DIVISION 46 - WATER AND WASTEWATER EQUIPMENT	
DIVISION 48 - ELECTRICAL POWER GENERATION	
ALLOWANCE	\$ 899,299.19
Total Cost Summary (Including General Requirements):	\$ 22,300,000.19

Note : Ignore CSI divisions that do not apply to this project

BID SUBMISSION FORM

Bidder Name: E&A RESTORATION INC
Procurement Title: 85023B0022-SANDBOMB NYPD Bomb Squad Building
RFx Name: 85023B0022-SANDBOMB NYPD Bomb Squad Building

The above-named bidder affirms and declares:

- 1. The bidder has completed and submitted all required information for the above procurement in the PASSPort system;
- 2. Any discrepancy between the bid price listed on this Bid Submission Form and the bid information submitted in PASSPort may result in the agency finding the bid non-responsive; and
- 3. This bid is being submitted in accordance with New York State General Municipal Law § 103.

Lump Sum Bid Amount (Bid Price Item Grid) \$ 21,400,701.⁰⁰/_{xx}
+ All Allowances (Allowances Item Grid) \$ 899,299.¹⁹

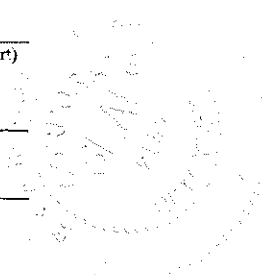
= Total Bid Price: (a/k/a Total Amount) \$ 22,300,000.¹⁹/_{xx}

Bidder Signature

EIN (if applicable): 11-3579414
(EIN must match the EIN of the entity that submitted bid information in PASSPort)

Bidder Name: E&A RESTORATION INC
JENNY SAKALIS, PRESIDENT
(Name of Partner of Corporate Officer)

By: Jenny Sakalis
Signature: Jenny Sakalis
(Signature of Partner of Corporate Officer)



Project References

A. Contracts completed by the bidder

List all contracts substantially completed within the last 4 years, up to a maximum of 10 projects, in descending order of date of substantial completion.

Project & Location	Contract Type	Contract Amount (\$000)	Date Completed	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)
		SEE ATTACHED.			



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

Projects Completed

Nassau County Police Center for Training and Intelligence

Location: Garden City, NY Contract No. B90230P03G
Owner: Nassau County Dept. Of Public Works, Joseph Amerigo 516-571-6804
Construction Cost: \$46,156,972.00
Contract Award: 8/1/19 Completed: 12/1/2022

Secure Detention for HORIZONS Juvenile Interim Facility

Location: Bronx, NY Contract No. JJFACREN
Owner: NYC Department of Design & Construction, Anton Dolce 917-559-8286
Construction Cost: \$45,298,389.30
Contract Award: 2/2/18 Completed: 10/31/19

211 E.70th Street

Location: Manhattan, NY Contract No. 321702+321601
Owner: Rudin Management, Paul Mandel 212-407-2504
Construction Cost: \$70,000,000.00
Contract Award: 11/04/16 Completed: 8/30/2020

Dormitory Renovations to Yaphank Correctional Facility

Location: Yaphank, NY Contract No. N/A
Owner: Suffolk County Department of Public Works, Jay Abbott 631-852-4242
Construction Cost: \$12,720,970.00
Contract Award: 1/20/15 Completed: 5/2018

Nassau County Public Safety Center Phase III, Forensics Lab

Location: Westbury, NY Contract No. B90230P03G
Owner: Nassau County Dept. Of Public Works, Joseph Amerigo 516-571-6804
Construction Cost: \$24,320,608.54
Contract Award: 12/16/13 Completed: 10/1/2018

Nassau Community College, Student Services Center

Location: Garden City, NY Contract No. B7008901G
Owner: Nassau Community College, Scott Brugge 516-572-9786 x28330
Construction Cost: \$11,712,215.22
Contract Award: 11/3/14 Completed: 9/1/17



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

Nassau Community College, On Call General Contractor

Location: Garden City, NY
113010-0946

Contract No. CY98-

Owner: Nassau Community College, Scott Brugge 516-572-9786 x28330

Construction Cost: \$5,154,221.07

Contract Award: 2/17/11

Completed: 3/31/16

Building Construction Requirements Contract, General Contractor

Location: Various Locations, Nassau County, NY

Contract No. B9040002G

Owner: County of Nassau, Michael Puleo 516-571-6917

Construction Cost: \$10,000,000.00

Contract Award: 8/1/12

Completed: 12/31/16

Hemsstead House Lintel Replacement & Window Rehabilitation

Sands Point, NY

Contract No. B9E100016G

Owner: County of Nassau

Architect: Beatty Harvey Coco Architects, LLP (631) 300-1010

Construction Cost: \$1,307,787.89

Contract Award: 11/25/13

Completed: 11/30/15

Rehabilitation of Sagamore Hill, National Historic Site

Oyster Bay, NY

Contract No. SAHI-077375

Owner: National Park Service (303) 969-2344

Architect: John G. Waite Associates, Architects

Construction Cost: \$8,554,579.39

Contract Award: 8/29/12

Completed: 7/31/14

Riverhead Building Renovation, Suffolk Community College

Ammerman Campus, Selden, NY

Contract No. CP2149, 2138, 2127

Owner: Suffolk County Community College

Paul Cooper (631) 451-4445

Architect: William F. Collins, AIA (631) 689-8450

Construction Cost: \$12,750,000.00

Contract Award: 3/21/13

Completed: 12/31/14

Alterations to Criminal Court Building

Riverhead, NY

Capital Project No. 1124

Architect: David Swift Architects (631) 351-5700

Construction Cost: \$1,808,419.00

Completed: 12/1/14

Contract Award: 8/26/13

B. Contracts currently under construction by the bidder

List all contracts currently under construction even if they are not similar to the contract being awarded.

Project & Location	Contract Type	Contract Amount (\$000)	Subcontracted to Others (\$000)	Uncompleted Portion (\$000)	Date Scheduled to Complete	Owner Reference & Tel. No.	Architect/ Engineer Reference & Tel. No. (if different from owner)
			SEE ATTACHED.				

**E & A RESTORATION INC.**

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

Projects In Progress

Nassau County Matrimonial Court

Location: Nassau County, NY	Contract No. B90632-02G
Owner: Nassau County Dept of Public Works	Contact: Joseph Amerigo (516) 571-6804
Contract Amount: \$102,550,428.07	% Completed: 60
Subcontractor Amount: \$ 72,707,240.64	
Contract Award: 3/30/20	Est. Completion: 04/2025

253 Broadway Landmark's Space Renovation

Location: New York, NY	Contract No. 20161423374
Owner: NYC Department of Design & Construction	Contact: Mark Forrester (917)-417-4133
Contract Amount: \$33,869,779.33	% Completed: 93
Subcontractor Amount: \$ 23,247,722.44	
Contract Award: 3/30/16	Est. Completion: 6/2023

Nassau County Building Construction Requirements, General Construction

Location: Nassau County, NY	Contract No. B9040004GR1
Owner: Nassau County Dept. Of Public Works	Contact: Michael Puleo (516) 571-6917
Contract Amount: TNE \$10,000,000	% Completed: 02
Contract Award: 06/08/2022	Est. Completion: 5/2024

C. Pending contracts not yet started by the bidder

List all contracts awarded to or won by the bidder but not yet started.

Project & Location	Contract Type	Contract Amount (\$000)	Date Scheduled to Start	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)
		NO PENDING CONTRACTS AT THIS TIME			



Buildings

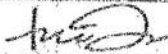
MASTER PLUMBER

Name: Lawrence J. Levine

License No: 161

Issue Date: 05/09/2019

Exp. Date: 06/17/2022


For the Commissioner of Buildings
Construction & Design




MASTER PLUMBER

Name
Lawrence J. Levine
Company
PAR PLUMBING CO., INC
Business Address
101 Park Avenue Lower Lobby, New York, NY 10178



P000161



NYC Department of Buildings

License Details

MASTER PLUMBER
LAWRENCE J LEVINE

Date Issued: 08/10/1999

License #: 060161

Status: A - ACTIVE

Expiration: 09/17/2025

City Employee: No

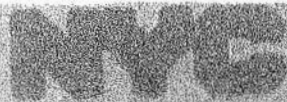
Office Address: 101 PARK AVENUE LOWER LOBBY NEW YORK, NY 10178

Business Phone: 212-926-1090

Ordinary Plumbing Work

Business 1 : PAR PLUMBING CO., INC

Insurance Type	Policy	Required	Company	Expiration
General Liability	1000025485211	Yes	STARR INDEMNITY & LIABIL	11/01/21
Workers' Compensation	100 0601268	Yes	STARR INDEMNITY & LIABIL	11/01/21
Disability	110BL6716908	Yes	ARCH INSURANCE COMPANY	12/31/21



MASTER ELECTRICIAN

Name: Keith J. Moy

License No: 12650

Issue Date: 04/25/2022

Exp. Date: 06/07/2023



Acting
Commissioner's Signature

Name	Keith J. Moy
Business Name	MID CITY ELECTRICAL CORP.
Business Address	2190 Mcdonald Avenue, Brooklyn, NY 11223
Firm#	001610



A012650

Form **8879-S**

IRS e-file Signature Authorization for Form 1120-S

OMB No. 1545-0123

Department of the Treasury
Internal Revenue Service

- ▶ ERO must obtain and retain completed Form 8879-S.
- ▶ Go to www.irs.gov/Form8879S for the latest information.

2019

For calendar year 2019, or tax year beginning **NOV 1**, 2019, and ending **OCT 31**, 20**20**.

Name of corporation **E & A RESTORATION INC.
C/O E & A CONSTRUCTION**

Employer identification number
11-3579414

Part I Tax Return Information (Whole dollars only)

1	Gross receipts or sales less returns and allowances (Form 1120-S, line 1c)	1	36,549,779.
2	Gross profit (Form 1120-S, line 3)	2	5,832,871.
3	Ordinary business income (loss) (Form 1120-S, line 21)	3	3,528,105.
4	Net rental real estate income (loss) (Form 1120-S, Schedule K, line 2)	4	
5	Income (loss) reconciliation (Form 1120-S, Schedule K, line 18)	5	3,673,242.

Part II Declaration and Signature Authorization of Officer (Be sure to get a copy of the corporation's return)

Under penalties of perjury, I declare that I am an officer of the above corporation and that I have examined a copy of the corporation's 2019 electronic income tax return and accompanying schedules and statements and to the best of my knowledge and belief, it is true, correct, and complete. I further declare that the amounts in Part I above are the amounts shown on the copy of the corporation's electronic income tax return. I consent to allow my electronic return originator (ERO), transmitter, or intermediate service provider to send the corporation's return to the IRS and to receive from the IRS (a) an acknowledgement of receipt or reason for rejection of the transmission, (b) the reason for any delay in processing the return or refund, and (c) the date of any refund. If applicable, I authorize the U.S. Treasury and its designated Financial Agent to initiate an electronic funds withdrawal (direct debit) entry to the financial institution account indicated in the tax preparation software for payment of the corporation's federal taxes owed on this return, and the financial institution to debit the entry to this account. To revoke a payment, I must contact the U.S. Treasury Financial Agent at **1-888-353-4537** no later than 2 business days prior to the payment (settlement) date. I also authorize the financial institutions involved in the processing of the electronic payment of taxes to receive confidential information necessary to answer inquiries and resolve issues related to the payment. I have selected a personal identification number (PIN) as my signature for the corporation's electronic income tax return and, if applicable, the corporation's consent to electronic funds withdrawal.

Officer's PIN: check one box only

I authorize **MARCUM LLP** to enter my PIN **79414** as my signature on the corporation's 2019 electronically filed income tax return.
ERO firm name Don't enter all zeros

As an officer of the corporation, I will enter my PIN as my signature on the corporation's 2019 electronically filed income tax return.

Officer's signature ▶ *Kalliope Vavourou* Date ▶ **05/07/2021** Title ▶ **PRESIDENT**

Part III Certification and Authentication

ERO's EFIN/PIN. Enter your six-digit EFIN followed by your five-digit self-selected PIN. **12486711747**
Don't enter all zeros

I certify that the above numeric entry is my PIN, which is my signature on the 2019 electronically filed income tax return for the corporation indicated above. I confirm that I am submitting this return in accordance with the requirements of **Pub. 3112**, IRS e-file Application and Participation, and **Pub. 4163**, Modernized e-File (MeF) Information for Authorized IRS e-file Providers for Business Returns.

ERO's signature ▶ *Daniel Castellano* Date ▶ **04/30/2021**

ERO Must Retain This Form - See Instructions
Don't Submit This Form to the IRS Unless Requested To Do So

For Paperwork Reduction Act Notice, see instructions.

Form **8879-S** (2019)

LHA



New York State E-File Authorization for Tax Year 2019
For Certain Corporation Tax Returns and Estimated Tax Payments for Corporations

Electronic return originator (ERO)/paid preparer. Do not mail this form to the Tax Department. Keep it for your records.

Legal name of corporation: E & A RESTORATION INC.

Return type (mark an X for all that apply): CT-3, CT-3-A, CT-3-M, CT-3-S X, CT-13, CT-33, CT-33-A, CT-33-C, CT-33-M, CT-33-NL, CT-183, CT-183-M, CT-184, CT-184-M, CT-186-E, CT-300, CT-400

Purpose

Form TR-579-CT must be completed to authorize an ERO to e-file a corporation tax return and to transmit bank account information for the electronic funds withdrawal.

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns. Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case. Note that an alternative signature can be used as described in TSB-M-05(1)C, Alternative Methods of Signing for Tax Return Preparers. Go to our website at www.tax.ny.gov to find this document.

General instructions

Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return before the ERO transmits the electronically filed Form CT-3, General Business Corporation Franchise Tax Return; CT-3-A, General Business Corporation Combined Franchise Tax Return; CT-3-M, General Business Corporation MTA Surcharge Return; CT-3-S, New York S Corporation Franchise Tax Return; CT-13, Unrelated Business Income Tax Return; CT-33, Life Insurance Corporation Franchise Tax Return; CT-33-A, Life Insurance Corporation Combined Franchise Tax Return; CT-33-C, Captive Insurance Company Franchise Tax Return; CT-33-M, Insurance Corporation MTA Surcharge Return; CT-33-NL, Non-Life Insurance Corporation Franchise Tax Return; CT-183, Transportation and Transmission Corporation Franchise Tax Return on Capital Stock; CT-183-M, Transportation and Transmission Corporation MTA Surcharge Return; CT-184, Transportation and Transmission Corporation Franchise Tax Return on Gross Earnings; CT-184-M, Transportation and Transmission Corporation MTA Surcharge Return; CT-186-E, Telecommunications Tax Return and Utility Services Tax Return; CT-300, Mandatory First Installment (MFI) of Estimated Tax for Corporations; or CT-400, Estimated Tax for Corporations.

Do not mail this form to the Tax Department. EROs/paid preparers must keep this form for three years and present it to the Tax Department upon request.

Do not use this form for electronically filed Form CT-5, Request for Six-Month Extension to File (for franchise/business taxes, MTA surcharge, or both); CT-5.3, Request for Six-Month Extension to File (for combined franchise tax return, or combined MTA surcharge return, or both); CT-5.4, Request for Six-Month Extension to File New York S Corporation Franchise Tax Return; CT-5.6, Request for Three-Month Extension to File Form CT-186 (for utility corporation franchise tax return, MTA surcharge return, or both); CT-5.9, Request for Three-Month Extension to File (for certain Article 9 tax returns, MTA surcharge, or both); or CT-5.9-E, Request for Three-Month Extension to File Form CT-186-E (for telecommunications tax return and utility services tax return). Instead use Form TR-579-1-CT, New York State Authorization for Electronic Funds Withdrawal For Tax Year 2019 Corporation Tax Extensions.

Financial institution information (required if electronic payment is authorized)
1 Amount of authorized debit
2 Financial institution routing number
3 Financial institution account number

Part A - Declaration of authorized corporate officer for Form CT-3, CT-3-A, CT-3-M, CT-3-S, CT-13, CT-33, CT-33-A, CT-33-C, CT-33-M, CT-33-NL, CT-183, CT-183-M, CT-184, CT-184-M, CT-186-E, CT-300, or CT-400
Under penalty of perjury, I declare that I have examined the information on this 2019 New York State electronic corporate tax return, including any accompanying schedules, attachments, and statements, and certify that this electronic return is true, correct, and complete.
Signature of authorized officer of the corporation: Kathia Vournou
Print your name and title: KATHIA VOURNOU, PRESIDENT
Date: 05/04/2021

Part B - Declaration of ERO and paid preparer
Under penalty of perjury, I declare that the information contained in this 2019 New York State electronic corporate tax return is the information furnished to me by the corporation.
ERO's signature: Daniel Castellano
Print name: DANIEL CASTELLANO, CPA
Date: 04/30/2021
Paid preparer's signature: Daniel Castellano
Print name: DANIEL CASTELLANO, CPA
Date: 07-15-21

NYC Department of Finance	NYC 579-GCT	NEW YORK CITY DEPARTMENT OF FINANCE		2019
		Signature Authorization for E-Filed General Corporation Tax Return		

ELECTRONIC RETURN ORIGINATORS (ERO): DO NOT MAIL THIS FORM TO THE DEPARTMENT OF FINANCE. KEEP THIS FOR YOUR RECORDS.

LEGAL NAME OF CORPORATION: E & A RESTORATION INC. C/O E & A CONSTRUCTION	EMPLOYER IDENTIFICATION NUMBER 11-3579414
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EMAIL ADDRESS: JSAKALIS@EARESTORATION.COM	TYPE OF RETURN: <input type="checkbox"/> NYC-EXT <input type="checkbox"/> NYC-EXT.1 <input type="checkbox"/> NYC-4S <input type="checkbox"/> NYC-400 (2020) <input type="checkbox"/> NYC-3A <input checked="" type="checkbox"/> NYC-3L <input type="checkbox"/> NYC-4SEZ
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Financial Institution Information - must be included if electronic payment is authorized

AMOUNT OF AUTHORIZED DEBIT:	FINANCIAL INSTITUTION ROUTING NUMBER:	FINANCIAL INSTITUTION ACCOUNT NUMBER:
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Part A - Declaration and authorization of corporate officer for Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400

Under penalty of perjury, I declare that I am an officer of the corporation authorized to act on behalf of the above-named corporation, and that I have examined the information on its 2019 New York City electronically filed corporation tax return, including any accompanying schedules, attachments, and statements or other report checked above, and to the best of my knowledge and belief, the electronically filed corporation tax return or other report is true, correct, and complete. The ERO has my consent to send the 2019 New York City electronically filed corporation tax return or other report checked above to New York City Department of Finance through the Internal Revenue Service. I authorize the ERO to enter my PIN as my signature on the 2019 New York City electronically filed corporation tax return or other report, or I will enter my PIN as my signature on the 2019 New York City electronically filed corporation tax return or other report. If I am paying the New York City corporation tax owed by electronic funds withdrawal, I authorize the New York City Department of Finance and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on the corporation's 2019 New York City electronically filed corporation tax return or other report, and I authorize the financial institution to debit the amount from that account.

Officer's PIN (mark an X in one box only)

I authorize MARCUM LLP ERO FIRM NAME to enter my PIN: 79414

as my signature on the corporation's 2019 electronically filed corporation tax return or other report checked above.

As an authorized person of the corporation, I will enter my PIN as my signature on the corporation's 2019 electronically filed corporation tax return or other report checked above.

Kalliope Vavouras Signature of authorized person PRESIDENT Official title 05/04/2021 Date

Part B - Declaration of electronic return originator (ERO) and paid preparer

Under penalty of perjury, I declare that the information contained in the above-named corporation's 2019 New York City electronically filed corporation tax return or other report checked above is the information furnished to me by the corporation's authorized officer. If the corporate officer furnished me with a completed 2019 New York City paper corporation tax return or other report signed by a paid preparer, I declare that the information contained in the corporation's 2019 New York City electronically filed corporation tax return or report is identical to that contained in the paper return or report. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2019 New York City electronically filed corporation tax return or other report, and, to the best of my knowledge and belief, the return or other report is true, correct, and complete. I have based this declaration on all information available to me.

ERO EFIN/PIN: Enter your six-digit EFIN followed by your five digit PIN: 12486711747

Daniel Castellano Print Name 04/30/2021 Date
DANIEL CASTELLANO, CPA Print Name 07/15/21 Date

PURPOSE - A completed Form NYC-579-GCT provides documentation that an ERO has been authorized to electronically file the General Corporation Tax return or other report. The officer of the corporation who is authorized to sign the corporation's returns may designate the ERO to electronically sign the return or other report by entering the officer's personal identification number (PIN). The form also authorizes payment of tax due on an electronically submitted return or report by an automatic clearing house (ACH) debit from a designated checking or savings account of the corporation. **You cannot revoke this authorization.**

GENERAL INSTRUCTIONS - Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return or report before the ERO transmits the electronically filed Form NYC-3A (Combined General Corporation Tax Return); NYC-3L (General Corporation Tax Return); NYC-4S (General Corporation Tax Return - short form); NYC-4SEZ (General Corporation Tax Return - EZ form); NYC-EXT (Application for 6-month Extension to File Business Income Tax Return); NYC-EXT.1 (Application for Additional Extension) or NYC-400 (Declaration of Estimated Tax by General Corporations).

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns or reports (Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400). Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case.

Do not mail Form NYC-579-GCT to the Department of Finance. The EROs/paid preparers must keep the completed Form NYC-579-GCT for three years from the due date of the return or report or the date the return or report was filed, whichever is later, and must present it to the Department of Finance upon request.

SSR Document History

May 04, 2021

Created:	May 04, 2021
By:	Debra(Debra.Defina@marcumllp.com)
Status:	USERSIGNED
Transaction ID:	2LGX6U7Z9034TAZ45F686TKQF8

"225296" History

Document created by DebraDefina(Debra.Defina@marcumllp.com)

4/30/2021 13:43:54 PM Eastern Daylight Time - IP Address

Document viewed by E & A RESTORATION INC. C/O E & A CONSTRUCTION(jsakalis@earestoration.com)

5/4/2021 11:08:34 AM Eastern Daylight Time - IP address: 24.185.100.70

Document e-signed by E & A RESTORATION INC. C/O E & A CONSTRUCTION(jsakalis@earestoration.com)

Signature Date: 5/4/2021 11:20:35 AM Eastern Daylight Time - IP address: 24.185.100.70

Document Signed and Filed.

5/4/2021 11:20:35 AM Eastern Daylight Time

Form **8879-S**

IRS e-file Signature Authorization for Form 1120-S

OMB No. 1545-0123

Department of the Treasury
Internal Revenue Service

- ▶ ERO must obtain and retain completed Form 8879-S.
- ▶ Go to www.irs.gov/Form8879S for the latest information.

2020

For calendar year 2020, or tax year beginning **NOV 1**, 2020, and ending **OCT 31**, 20**21**.

Name of corporation **E & A RESTORATION INC.
C/O E & A CONSTRUCTION**

Employer identification number
11-3579414

Part I Tax Return Information (Whole dollars only)

1	Gross receipts or sales less returns and allowances (Form 1120-S, line 1c)	1	35,173,120.
2	Gross profit (Form 1120-S, line 3)	2	4,200,094.
3	Ordinary business income (loss) (Form 1120-S, line 21)	3	1,854,466.
4	Net rental real estate income (loss) (Form 1120-S, Schedule K, line 2)	4	
5	Income (loss) reconciliation (Form 1120-S, Schedule K, line 18)	5	1,880,863.

Part II Declaration and Signature Authorization of Officer (Be sure to get a copy of the corporation's return)

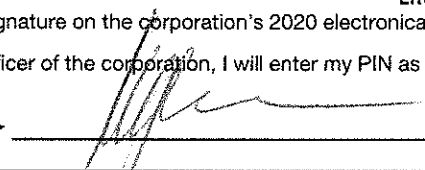
Under penalties of perjury, I declare that I am an officer of the above corporation and that I have examined a copy of the corporation's 2020 electronic income tax return and accompanying schedules and statements and to the best of my knowledge and belief, it is true, correct, and complete. I further declare that the amounts in Part I above are the amounts shown on the copy of the corporation's electronic income tax return. I consent to allow my electronic return originator (ERO), transmitter, or intermediate service provider to send the corporation's return to the IRS and to receive from the IRS (a) an acknowledgement of receipt or reason for rejection of the transmission, (b) the reason for any delay in processing the return or refund, and (c) the date of any refund. If applicable, I authorize the U.S. Treasury and its designated Financial Agent to initiate an electronic funds withdrawal (direct debit) entry to the financial institution account indicated in the tax preparation software for payment of the corporation's federal taxes owed on this return, and the financial institution to debit the entry to this account. To revoke a payment, I must contact the U.S. Treasury Financial Agent at **1-888-353-4537** no later than 2 business days prior to the payment (settlement) date. I also authorize the financial institutions involved in the processing of the electronic payment of taxes to receive confidential information necessary to answer inquiries and resolve issues related to the payment. I have selected a personal identification number (PIN) as my signature for the corporation's electronic income tax return and, if applicable, the corporation's consent to electronic funds withdrawal.

Officer's PIN: check one box only

I authorize **MARCUM LLP** to enter my PIN **79414**
 ERO firm name Don't enter all zeros

as my signature on the corporation's 2020 electronically filed income tax return.

As an officer of the corporation, I will enter my PIN as my signature on the corporation's 2020 electronically filed income tax return.

Officer's signature  Date **4-29-2022** Title **PRESIDENT**

Part III Certification and Authentication

ERO's EFIN/PIN. Enter your six-digit EFIN followed by your five-digit self-selected PIN. **12486711747**
 Don't enter all zeros

I certify that the above numeric entry is my PIN, which is my signature on the 2020 electronically filed income tax return for the corporation indicated above. I confirm that I am submitting this return in accordance with the requirements of **Pub. 3112**, IRS e-file Application and Participation, and **Pub. 4163**, Modernized e-File (MeF) Information for Authorized IRS e-file Providers for Business Returns.

ERO's signature  Date **03/29/2022**

ERO Must Retain This Form - See Instructions
Don't Submit This Form to the IRS Unless Requested To Do So

For Paperwork Reduction Act Notice, see instructions.

Form **8879-S** (2020)

LHA



New York State E-File Authorization for Tax Year 2020

TR-579-CT

For Certain Corporation Tax Returns and Estimated Tax Payments for Corporations

(9/20)

Electronic return originator (ERO)/paid preparer: Do not mail this form to the Tax Department. Keep it for your records.

Legal name of corporation **E & A RESTORATION INC.**

Return type (mark an X for all that apply): CT-3 CT-3-A CT-3-M CT-3-S CT-13 CT-33
 CT-33-A CT-33-C CT-33-M CT-33-NL CT-183 CT-183-M CT-184 CT-184-M
 CT-186-E CT-300 CT-400

Purpose

Form TR-579-CT must be completed to authorize an ERO to e-file a corporation tax return and to transmit bank account information for the electronic funds withdrawal.

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns. Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case. Note that an alternative signature can be used as described in TSB-M-05(1)C, *Alternative Methods of Signing for Tax Return Preparers*. Go to our website at www.tax.ny.gov to find this document.

General instructions

Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return before the ERO transmits the electronically filed Form CT-3, *General Business Corporation Franchise Tax Return*; CT-3-A, *General Business Corporation Combined Franchise Tax Return*; CT-3-M, *General Business Corporation MTA Surcharge Return*; CT-3-S, *New York S Corporation Franchise Tax Return*; CT-13, *Unrelated Business Income Tax Return*; CT-33, *Life Insurance Corporation Franchise Tax Return*; CT-33-A, *Life Insurance Corporation Combined Franchise Tax Return*; CT-33-C, *Captive Insurance Company Franchise Tax Return*; CT-33-M, *Insurance Corporation MTA Surcharge Return*; CT-33-NL, *Non-Life Insurance Corporation Franchise Tax Return*; CT-183, *Transportation and Transmission Corporation Franchise Tax Return on Capital Stock*; CT-183-M, *Transportation and Transmission Corporation MTA Surcharge Return*; CT-184, *Transportation and Transmission Corporation Franchise Tax Return on Gross Earnings*; CT-184-M, *Transportation and Transmission Corporation MTA Surcharge Return*; CT-186-E, *Telecommunications Tax Return and Utility Services Tax Return*; CT-300, *Mandatory First Installment (MFI) of Estimated Tax for Corporations*; or CT-400, *Estimated Tax for Corporations*.

Do not mail this form to the Tax Department. EROs/paid preparers must keep this form for three years and present it to the Tax Department upon request.

Do not use this form for electronically filed Form CT-5, Request for Six-Month Extension to File (for franchise/business taxes, MTA surcharge, or both); CT-5.3, Request for Six-Month Extension to File (for combined franchise tax return, or combined MTA surcharge return, or both); CT-5.4, Request for Six-Month Extension to File New York S Corporation Franchise Tax Return; CT-5.6, Request for Three-Month Extension to File Form CT-186 (for utility corporation franchise tax return, MTA surcharge return, or both); CT-5.9, Request for Three-Month Extension to File (for certain Article 9 tax returns, MTA surcharge, or both); or CT-5.9-E, Request for Three-Month Extension to File Form CT-186-E (for telecommunications tax return and utility services tax return). Instead use Form TR-579.1-CT, New York State Authorization for Electronic Funds Withdrawal For Tax Year 2020 Corporation Tax Extensions.

Financial institution information (required if electronic payment is authorized)

- 1 Amount of authorized debit
- 2 Financial institution routing number
- 3 Financial institution account number

1	
2	
3	

Part A - Declaration of authorized corporate officer for Form CT-3, CT-3-A, CT-3-M, CT-3-S, CT-13, CT-33, CT-33-A, CT-33-C, CT-33-M, CT-33-NL, CT-183, CT-183-M, CT-184, CT-184-M, CT-186-E, CT-300, or CT-400

Under penalty of perjury, I declare that I have examined the information on this 2020 New York State electronic corporate tax return, including any accompanying schedules, attachments, and statements, and certify that this electronic return is true, correct, and complete. If this filing includes Form DTF-686, *Tax Shelter Reportable Transactions*, as an authorized officer of the corporation, I hereby consent to the waiver of the secrecy provisions of Tax Law sections 202, 211.8, 1467, and 1518 as such provisions relate to the disclosure requirements of Tax Law section 25. The ERO has my consent to send this 2020 New York State electronic corporate return to New York State through the Internal Revenue Service (IRS). I understand that by executing this Form TR-579-CT, I am authorizing the ERO to sign and file this return on behalf of the corporation and agree that the ERO's submission of the corporation's return to the IRS, together with this authorization, will serve as the electronic signature for the return and any authorized payment transaction. If I am paying New York State corporation taxes due by electronic funds withdrawal, I authorize the New York State Tax Department and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on this 2020 electronic return, and I authorize the financial institution to withdraw the amount from the account. As New York does not support International ACH Transactions (IAT), I attest the source for these funds is within the United States. I understand and agree that I may revoke this authorization for payment only by contacting the Tax Department no later than two business days prior to the payment date.

Signature of authorized officer of the corporation	Print your name and title KALLIOPE VOURNOU, PRESIDENT	Date 2-29-2022
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Part B - Declaration of ERO and paid preparer

Under penalty of perjury, I declare that the information contained in this 2020 New York State electronic corporate tax return is the information furnished to me by the corporation. If the corporation furnished me a completed paper 2020 New York State corporate tax return signed by a paid preparer, I declare that the information contained in the corporation's 2020 New York State electronic corporate tax return is identical to that contained in the paper return. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2020 New York State electronic corporate tax return, and, to the best of my knowledge and belief, the return is true, correct, and complete. I have based this declaration on all information available to me.

ERO's signature	Print name PAUL DITREDICI, CPA	Date 03/29/2022
	Print name PAUL DITREDICI, CPA	Date

ELECTRONIC RETURN ORIGINATORS (ERO): DO NOT MAIL THIS FORM TO THE DEPARTMENT OF FINANCE. KEEP THIS FOR YOUR RECORDS.

LEGAL NAME OF CORPORATION: E & A RESTORATION INC. C/O E & A CONSTRUCTION	EMPLOYER IDENTIFICATION NUMBER <u>11-3579414</u>
EMAIL ADDRESS: JSAKALIS@EARESTORATION.COM	TYPE OF RETURN: <input type="checkbox"/> NYC-EXT <input type="checkbox"/> NYC-EXT.1 <input type="checkbox"/> NYC-4S <input type="checkbox"/> NYC-400 (2021) <input type="checkbox"/> NYC-3A <input checked="" type="checkbox"/> NYC-3L <input type="checkbox"/> NYC-4SEZ

Financial Institution Information - *must be included if electronic payment is authorized*

AMOUNT OF AUTHORIZED DEBIT:	FINANCIAL INSTITUTION ROUTING NUMBER:	FINANCIAL INSTITUTION ACCOUNT NUMBER:
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Part A - Declaration and authorization of corporate officer for Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400

Under penalty of perjury, I declare that I am an officer of the corporation authorized to act on behalf of the above-named corporation, and that I have examined the information on its 2020 New York City electronically filed corporation tax return, including any accompanying schedules, attachments, and statements or other report checked above, and to the best of my knowledge and belief, the electronically filed corporation tax return or other report is true, correct, and complete. The ERO has my consent to send the 2020 New York City electronically filed corporation tax return or other report checked above to New York City Department of Finance through the Internal Revenue Service. I authorize the ERO to enter my PIN as my signature on the 2020 New York City electronically filed corporation tax return or other report, or I will enter my PIN as my signature on the 2020 New York City electronically filed corporation tax return or other report. If I am paying the New York City corporation tax owed by electronic funds withdrawal, I authorize the New York City Department of Finance and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on the corporation's 2020 New York City electronically filed corporation tax return or other report, and I authorize the financial institution to debit the amount from that account.

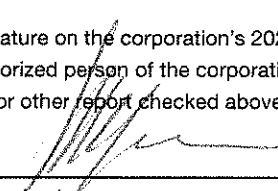
Officer's PIN (mark an X in one box only)

I authorize MARCUM LLP to enter my PIN: 79414

ERO FIRM NAME

as my signature on the corporation's 2020 electronically filed corporation tax return or other report checked above.

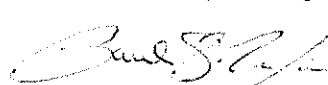
As an authorized person of the corporation, I will enter my PIN as my signature on the corporation's 2020 electronically filed corporation tax return or other report checked above.

 _____ Signature of authorized person	<u>PRESIDENT</u> _____ Official title	<u>4-29-2020</u> _____ Date
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Part B - Declaration of electronic return originator (ERO) and paid preparer

Under penalty of perjury, I declare that the information contained in the above-named corporation's 2020 New York City electronically filed corporation tax return or other report checked above is the information furnished to me by the corporation's authorized officer. If the corporate officer furnished me with a completed 2020 New York City paper corporation tax return or other report signed by a paid preparer, I declare that the information contained in the corporation's 2020 New York City electronically filed corporation tax return or report is identical to that contained in the paper return or report. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2020 New York City electronically filed corporation tax return or other report, and, to the best of my knowledge and belief, the return or other report is true, correct, and complete. I have based this declaration on all information available to me.

ERO EFIN/PIN: Enter your six-digit EFIN followed by your five digit PIN: 12486711747

 _____ Print Name	<u>03/29/2022</u> _____ Date
--	------------------------------------

<u>PAUL DITREDICI, CPA</u> _____ Paid Preparer's Signature	<u>PAUL DITREDICI, CPA</u> _____ Print Name	_____ _____ Date
--	---	------------------------

PURPOSE - A completed Form NYC-579-GCT provides documentation that an ERO has been authorized to electronically file the General Corporation Tax return or other report. The officer of the corporation who is authorized to sign the corporation's returns may designate the ERO to electronically sign the return or other report by entering the officer's personal identification number (PIN). The form also authorizes payment of tax due on an electronically submitted return or report by an automatic clearing house (ACH) debit from a designated checking or savings account of the corporation. **You cannot revoke this authorization.**

GENERAL INSTRUCTIONS - Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return or report before the ERO transmits the electronically filed Form NYC-3A (Combined General Corporation Tax Return); NYC-3L (General Corporation Tax Return); NYC-4S (General Corporation Tax Return - short form); NYC-4SEZ (General Corporation Tax Return - EZ form); NYC-EXT (Application for 6-month Extension to File Business Income Tax Return); NYC-EXT.1 (Application for Additional Extension) or NYC-400 (Declaration of Estimated Tax by General Corporations).

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns or reports (Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400). Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case.

Do not mail Form NYC-579-GCT to the Department of Finance. The EROs/paid preparers must keep the completed Form NYC-579-GCT for three years from the due date of the return or report or the date the return or report was filed, whichever is later, and must present it to the Department of Finance upon request.

ELECTRONIC RETURN ORIGINATORS (ERO): DO NOT MAIL THIS FORM TO THE DEPARTMENT OF FINANCE. KEEP THIS FOR YOUR RECORDS.

LEGAL NAME OF CORPORATION: E & A RESTORATION INC. C/O E & A CONSTRUCTION	EMPLOYER IDENTIFICATION NUMBER 11-3579414
EMAIL ADDRESS: JSAKALIS@EARESTORATION.COM	TYPE OF RETURN: <input checked="" type="checkbox"/> NYC-EXT <input type="checkbox"/> NYC-EXT.1 <input type="checkbox"/> NYC-4S <input type="checkbox"/> NYC-400 (2021) <input type="checkbox"/> NYC-3A <input type="checkbox"/> NYC-3L <input type="checkbox"/> NYC-4SEZ

Financial Institution Information - must be included if electronic payment is authorized

AMOUNT OF AUTHORIZED DEBIT:	FINANCIAL INSTITUTION ROUTING NUMBER:	FINANCIAL INSTITUTION ACCOUNT NUMBER:
-----------------------------	---------------------------------------	---------------------------------------

Part A - Declaration and authorization of corporate officer for Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400

Under penalty of perjury, I declare that I am an officer of the corporation authorized to act on behalf of the above-named corporation, and that I have examined the information on its 2020 New York City electronically filed corporation tax return, including any accompanying schedules, attachments, and statements or other report checked above, and to the best of my knowledge and belief, the electronically filed corporation tax return or other report is true, correct, and complete. The ERO has my consent to send the 2020 New York City electronically filed corporation tax return or other report checked above to New York City Department of Finance through the Internal Revenue Service. I authorize the ERO to enter my PIN as my signature on the 2020 New York City electronically filed corporation tax return or other report, or I will enter my PIN as my signature on the 2020 New York City electronically filed corporation tax return or other report. If I am paying the New York City corporation tax owed by electronic funds withdrawal, I authorize the New York City Department of Finance and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on the corporation's 2020 New York City electronically filed corporation tax return or other report, and I authorize the financial institution to debit the amount from that account.

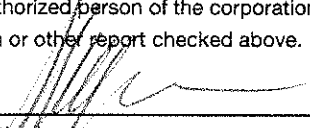
Officer's PIN (mark an X in one box only)

I authorize MARCUM LLP to enter my PIN: 79414

ERO FIRM NAME

as my signature on the corporation's 2020 electronically filed corporation tax return or other report checked above.

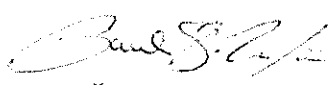
As an authorized person of the corporation, I will enter my PIN as my signature on the corporation's 2020 electronically filed corporation tax return or other report checked above.

	<u>PRESIDENT</u>	<u>4-29-2022</u>
<small>Signature of authorized person</small>	<small>Official title</small>	<small>Date</small>

Part B - Declaration of electronic return originator (ERO) and paid preparer

Under penalty of perjury, I declare that the information contained in the above-named corporation's 2020 New York City electronically filed corporation tax return or other report checked above is the information furnished to me by the corporation's authorized officer. If the corporate officer furnished me with a completed 2020 New York City paper corporation tax return or other report signed by a paid preparer, I declare that the information contained in the corporation's 2020 New York City electronically filed corporation tax return or report is identical to that contained in the paper return or report. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2020 New York City electronically filed corporation tax return or other report, and, to the best of my knowledge and belief, the return or other report is true, correct, and complete. I have based this declaration on all information available to me.

ERO EFIN/PIN: Enter your six-digit EFIN followed by your five digit PIN: 12486711747

	<u>03/29/2022</u>
<u>PAUL DITREDICI, CPA</u>	<u>PAUL DITREDICI, CPA</u>
<small>Paid Preparer's Signature</small>	<small>Date</small>

PURPOSE - A completed Form NYC-579-GCT provides documentation that an ERO has been authorized to electronically file the General Corporation Tax return or other report. The officer of the corporation who is authorized to sign the corporation's returns may designate the ERO to electronically sign the return or other report by entering the officer's personal identification number (PIN). The form also authorizes payment of tax due on an electronically submitted return or report by an automatic clearing house (ACH) debit from a designated checking or savings account of the corporation. **You cannot revoke this authorization.**

GENERAL INSTRUCTIONS - Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return or report before the ERO transmits the electronically filed Form NYC-3A (Combined General Corporation Tax Return); NYC-3L (General Corporation Tax Return); NYC-4S (General Corporation Tax Return - short form); NYC-4SEZ (General Corporation Tax Return - EZ form); NYC-EXT (Application for 6-month Extension to File Business Income Tax Return); NYC-EXT.1 (Application for Additional Extension) or NYC-400 (Declaration of Estimated Tax by General Corporations).

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns or reports (Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400). Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case.

Do not mail Form NYC-579-GCT to the Department of Finance. The EROs/paid preparers must keep the completed Form NYC-579-GCT for three years from the due date of the return or report or the date the return or report was filed, whichever is later, and must present it to the Department of Finance upon request.

Form **8879-S**

IRS e-file Signature Authorization for Form 1120-S

OMB No. 1545-0123

Department of the Treasury
Internal Revenue Service

- ▶ ERO must obtain and retain completed Form 8879-S.
- ▶ Go to www.irs.gov/Form8879S for the latest information.

2021

For calendar year 2021, or tax year beginning **NOV 1**, 2021, and ending **OCT 31**, 20**22**.

Name of corporation **E & A RESTORATION INC.**
C/O E & A CONSTRUCTION

Employer identification number
11-3579414

Part I Tax Return Information (Whole dollars only)		
1	Gross receipts or sales less returns and allowances (Form 1120-S, line 1c)	66,470,048.
2	Gross profit (Form 1120-S, line 3)	14,974,917.
3	Ordinary business income (loss) (Form 1120-S, line 21)	12,069,545.
4	Net rental real estate income (loss) (Form 1120-S, Schedule K, line 2)	
5	Income (loss) reconciliation (Form 1120-S, Schedule K, line 18)	11,926,943.

Part II Declaration and Signature Authorization of Officer (Be sure to get a copy of the corporation's return)

Under penalties of perjury, I declare that I am an officer of the above corporation and that I have examined a copy of the corporation's 2021 electronic income tax return and accompanying schedules and statements and to the best of my knowledge and belief, it is true, correct, and complete. I further declare that the amounts in Part I above are the amounts shown on the copy of the corporation's electronic income tax return. I consent to allow my electronic return originator (ERO), transmitter, or intermediate service provider to send the corporation's return to the IRS and to receive from the IRS (a) an acknowledgement of receipt or reason for rejection of the transmission, (b) the reason for any delay in processing the return or refund, and (c) the date of any refund. If applicable, I authorize the U.S. Treasury and its designated Financial Agent to initiate an electronic funds withdrawal (direct debit) entry to the financial institution account indicated in the tax preparation software for payment of the corporation's federal taxes owed on this return, and the financial institution to debit the entry to this account. To revoke a payment, I must contact the U.S. Treasury Financial Agent at **1-888-353-4537** no later than 2 business days prior to the payment (settlement) date. I also authorize the financial institutions involved in the processing of the electronic payment of taxes to receive confidential information necessary to answer inquiries and resolve issues related to the payment. I have selected a personal identification number (PIN) as my signature for the corporation's electronic income tax return and, if applicable, the corporation's consent to electronic funds withdrawal.

Officer's PIN: check one box only

I authorize **MARCUM LLP** to enter my PIN **79414**
ERO firm name Don't enter all zeros
 as my signature on the corporation's 2021 electronically filed income tax return.

As an officer of the corporation, I will enter my PIN as my signature on the corporation's 2021 electronically filed income tax return.

Officer's signature ▶ *Jenny Sakalis* Date ▶ 03/22/2023 Title ▶ PRESIDENT

Part III Certification and Authentication

ERO's EFIN/PIN. Enter your six-digit EFIN followed by your five-digit self-selected PIN. **12486711747**
Don't enter all zeros

I certify that the above numeric entry is my PIN, which is my signature on the 2021 electronically filed income tax return for the corporation indicated above. I confirm that I am submitting this return in accordance with the requirements of **Pub. 3112**, IRS e-file Application and Participation, and **Pub. 4103**, Modernized e-File (MeF) Information for Authorized IRS e-file Providers for Business Returns.

ERO's signature ▶ *[Signature]* Date ▶ 03/21/2023

ERO Must Retain This Form - See Instructions
Don't Submit This Form to the IRS Unless Requested To Do So

For Paperwork Reduction Act Notice, see instructions.
 LHA

Form **8879-S** (2021)



New York State E-File Authorization for Tax Year 2021
For Certain Corporation Tax Returns and Estimated Tax Payments for Corporations

Electronic return originator (ERO)/paid preparer: Do not mail this form to the Tax Department. Keep it for your records.

Legal name of corporation E & A RESTORATION INC.

Return type (mark an X for all that apply): CT-3 CT-3-A CT-3-M CT-3-S X CT-13 CT-33 CT-33-A CT-33-C CT-33-M CT-33-NL CT-183 CT-183-M CT-184 CT-184-M CT-186-E CT-300 CT-400

Purpose

Form TR-579-CT must be completed to authorize an ERO to e-file a corporation tax return and to transmit bank account information for the electronic funds withdrawal.

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns. Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case. Note that an electronic signature can be used as described in TSB-M-20(1)C, (2), E-File Authorizations (TR-579 forms) for Taxpayers Using a Paid Preparer for Electronically Filed Tax Returns. Go to our website at www.tax.ny.gov to find this document.

General instructions

Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return before the ERO transmits the electronically filed Form CT-3, General Business Corporation Franchise Tax Return; CT-3-A, General Business Corporation Combined Franchise Tax Return; CT-3-M, General Business Corporation MTA Surcharge Return; CT-3-S, New York S Corporation Franchise Tax Return; CT-13, Unrelated Business Income Tax Return; CT-33, Life Insurance Corporation Franchise Tax Return; CT-33-A, Life Insurance Corporation Combined Franchise Tax Return; CT-33-C, Captive Insurance Company Franchise Tax Return; CT-33-M, Insurance Corporation MTA Surcharge Return; CT-33-NL, Non-Life Insurance Corporation Franchise Tax Return; CT-183, Transportation and Transmission Corporation Franchise Tax Return on Capital Stock; CT-183-M, Transportation and Transmission Corporation MTA Surcharge Return; CT-184, Transportation and Transmission Corporation Franchise Tax Return on Gross Earnings; CT-184-M, Transportation and Transmission Corporation MTA Surcharge Return; CT-186-E, Telecommunications Tax Return and Utility Services Tax Return; CT-300, Mandatory First Installment (MFI) of Estimated Tax for Corporations; or CT-400, Estimated Tax for Corporations.

Do not mail this form to the Tax Department. EROs/paid preparers must keep this form for three years and present it to the Tax Department upon request.

Do not use this form for electronically filed Form CT-5, Request for Six-Month Extension to File (for franchise/business taxes, MTA surcharge, or both); CT-5.3, Request for Six-Month Extension to File (for combined franchise tax return, or combined MTA surcharge return, or both); CT-5.4, Request for Six-Month Extension to File New York S Corporation Franchise Tax Return; CT-5.6, Request for Three-Month Extension to File Form CT-186 (for utility corporation franchise tax return, MTA surcharge return, or both); CT-5.9, Request for Three-Month Extension to File (for certain Article 9 tax returns, MTA surcharge, or both); or CT-5.9-E, Request for Three-Month Extension to File Form CT-186-E (for telecommunications tax return and utility services tax return). Instead use Form TR-579.1-CT, New York State Authorization for Electronic Funds Withdrawal For Tax Year 2021 Corporation Tax Extensions.

Financial institution information (required if electronic payment is authorized)

- 1 Amount of authorized debit
2 Financial institution routing number
3 Financial institution account number

Table with 3 rows and 2 columns for financial institution information.

Part A - Declaration of authorized corporate officer for Form CT-3, CT-3-A, CT-3-M, CT-3-S, CT-13, CT-33, CT-33-A, CT-33-C, CT-33-M, CT-33-NL, CT-183, CT-183-M, CT-184, CT-184-M, CT-186-E, CT-300, or CT-400

Under penalty of perjury, I declare that I have examined the information on this 2021 New York State electronic corporate tax return, including any accompanying schedules, attachments, and statements, and certify that this electronic return is true, correct, and complete. If this filing includes Form DTF-886, Tax Shelter Reportable Transactions, as an authorized officer of the corporation, I hereby consent to the waiver of the secrecy provisions of Tax Law sections 202, 211.8, 1487, and 1518 as such provisions relate to the disclosure requirements of Tax Law section 25. The ERO has my consent to send this 2021 New York State electronic corporate return to New York State through the Internal Revenue Service (IRS). I understand that by executing this Form TR-579-CT, I am authorizing the ERO to sign and file this return on behalf of the corporation and agree that the ERO's submission of the corporation's return to the IRS, together with this authorization, will serve as the electronic signature for the return and any authorized payment transaction. If I am paying New York State corporation taxes due by electronic funds withdrawal, I authorize the New York State Tax Department and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on this 2021 electronic return, and I authorize the financial institution to withdraw the amount from the account. As New York does not support International ACH Transactions (IAT), I attest the source for these funds is within the United States. I understand and agree that I may revoke this authorization for payment only by contacting the Tax Department no later than two business days prior to the payment date.

Signature of authorized officer of the corporation: Jenny Sakalis, JENNY SAKALIS, PRESIDENT, Date: 03/22/2023

Part B - Declaration of ERO and paid preparer

Under penalty of perjury, I declare that the information contained in this 2021 New York State electronic corporate tax return is the information furnished to me by the corporation. If the corporation furnished me a completed paper 2021 New York State electronic corporate tax return signed by a paid preparer, I declare that the information contained in the corporation's 2021 New York State electronic corporate tax return is identical to that contained in the paper return. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2021 New York State electronic corporate tax return, and, to the best of my knowledge and belief, the return is true, correct, and complete. I have based this declaration on all information available to me.

Table with 3 columns: Signature, Print name, Date. ERO's signature: Paul Ditredici, PAUL DITREDICI, CPA, Date: 03/21/2023

NYC Department of Finance	NYC 579-GCT	NEW YORK CITY DEPARTMENT OF FINANCE		2021
		Signature Authorization for E-Filed General Corporation Tax Return		

ELECTRONIC RETURN ORIGINATORS (ERO): DO NOT MAIL THIS FORM TO THE DEPARTMENT OF FINANCE. KEEP THIS FOR YOUR RECORDS.

LEGAL NAME OF CORPORATION: E & A RESTORATION INC. C/O E & A CONSTRUCTION	EMPLOYER IDENTIFICATION NUMBER 11-3579414
--	--

EMAIL ADDRESS: JSAKALIS@EARESTORATION.COM	TYPE OF RETURN: <input type="checkbox"/> NYC-EXT <input type="checkbox"/> NYC-EXT.1 <input type="checkbox"/> NYC-4S <input type="checkbox"/> NYC-400 (2022) <input type="checkbox"/> NYC-3A <input checked="" type="checkbox"/> NYC-3L <input type="checkbox"/> NYC-4SEZ
--	---

Financial Institution Information - <i>must be included if electronic payment is authorized</i>		
AMOUNT OF AUTHORIZED DEBIT:	FINANCIAL INSTITUTION ROUTING NUMBER: 026013576	FINANCIAL INSTITUTION ACCOUNT NUMBER: 1501240997

Part A - Declaration and authorization of corporate officer for Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400

Under penalty of perjury, I declare that I am an officer of the corporation authorized to act on behalf of the above-named corporation, and that I have examined the information on its 2021 New York City electronically filed corporation tax return, including any accompanying schedules, attachments, and statements or other report checked above, and to the best of my knowledge and belief, the electronically filed corporation tax return or other report is true, correct, and complete. The ERO has my consent to send the 2021 New York City electronically filed corporation tax return or other report checked above to New York City Department of Finance through the Internal Revenue Service. I authorize the ERO to enter my PIN as my signature on the 2021 New York City electronically filed corporation tax return or other report, or I will enter my PIN as my signature on the 2021 New York City electronically filed corporation tax return or other report. If I am paying the New York City corporation tax owed by electronic funds withdrawal, I authorize the New York City Department of Finance and its designated financial agents to initiate an electronic funds withdrawal from the financial institution account indicated on the corporation's 2021 New York City electronically filed corporation tax return or other report, and I authorize the financial institution to debit the amount from that account.

Officer's PIN (mark an X in one box only)

I authorize MARCUM LLP to enter my PIN: 79414

ERO FIRM NAME

as my signature on the corporation's 2021 electronically filed corporation tax return or other report checked above.

As an authorized person of the corporation, I will enter my PIN as my signature on the corporation's 2021 electronically filed corporation tax return or other report checked above.

Jenny Sakalis PRESIDENT 03/22/2023

Signature of authorized person Official title Date

Part B - Declaration of electronic return originator (ERO) and paid preparer

Under penalty of perjury, I declare that the information contained in the above-named corporation's 2021 New York City electronically filed corporation tax return or other report checked above is the information furnished to me by the corporation's authorized officer. If the corporate officer furnished me with a completed 2021 New York City paper corporation tax return or other report signed by a paid preparer, I declare that the information contained in the corporation's 2021 New York City electronically filed corporation tax return or report is identical to that contained in the paper return or report. If I am the paid preparer, under penalty of perjury I declare that I have examined this 2021 New York City electronically filed corporation tax return or other report, and, to the best of my knowledge and belief, the return or other report is true, correct, and complete. I have based this declaration on all information available to me.

ERO EFIN/PIN: Enter your six-digit EFIN followed by your five digit PIN: 12486711747

Jenny Sakalis 03/21/2023

Print Name Date

PAUL DITREDICI, CPA 03/21/2023

Paid Preparer's Signature Print Name Date

PURPOSE - A completed Form NYC-579-GCT provides documentation that an ERO has been authorized to electronically file the General Corporation Tax return or other report. The officer of the corporation who is authorized to sign the corporation's returns may designate the ERO to electronically sign the return or other report by entering the officer's personal identification number (PIN). The form also authorizes payment of tax due on an electronically submitted return or report by an automatic clearing house (ACH) debit from a designated checking or savings account of the corporation. **You cannot revoke this authorization.**

GENERAL INSTRUCTIONS - Part A must be completed by an officer of the corporation who is authorized to sign the corporation's return or report before the ERO transmits the electronically filed Form NYC-3A (Combined General Corporation Tax Return); NYC-3L (General Corporation Tax Return); NYC-4S (General Corporation Tax Return - short form); NYC-4SEZ (General Corporation Tax Return - EZ form); NYC-EXT (Application for 6-month Extension to File Business Income Tax Return); NYC-EXT.1 (Application for Additional Extension) or NYC-400 (Declaration of Estimated Tax by General Corporations).

EROs/paid preparers must complete Part B prior to transmitting electronically filed corporation tax returns or reports (Forms NYC-3A, NYC-3L, NYC-4S, NYC-4SEZ, NYC-EXT, NYC-EXT.1 or NYC-400). Both the paid preparer and the ERO are required to sign Part B. However, if an individual performs as both the paid preparer and the ERO, he or she is only required to sign as the paid preparer. It is not necessary to include the ERO signature in this case.

Do not mail Form NYC-579-GCT to the Department of Finance. The EROs/paid preparers must keep the completed Form NYC-579-GCT for three years from the due date of the return or report or the date the return or report was filed, whichever is later, and must present it to the Department of Finance upon request.

SSR Document History

March 22, 2023

Created:	March 22, 2023
By:	Denise(Denise.Rooney@marcumllp.com)
Status:	USERSIGNED
Transaction ID:	R4YPY7NCJ8L4J2FAWJ0R6RMXVR

"225296" History

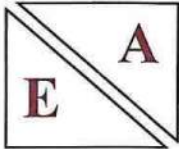
Document viewed by E & A RESTORATION INC. C/O E & A CONSTRUCTION(jsakalis@earestoration.com)
3/22/2023 10:38:54 AM Eastern Daylight Time - IP address: 24.185.101.190

Document e-signed by E & A RESTORATION INC. C/O E & A CONSTRUCTION(jsakalis@earestoration.com)

Signature Date: 3/22/2023 10:39:43 AM Eastern Daylight Time - IP address: 24.185.101.190

Document Signed and Filed.

3/22/2023 10:39:43 AM Eastern Daylight Time



E&A RESTORATION INC.

Affidavit

E&A Restoration, Inc. does not have an audited financial statements as our accountant reviews these two times per year.

A handwritten signature in blue ink that reads "Jenny Sakalis".

Jenny Sakalis, President

A handwritten signature in black ink that reads "Joanne Depalma".

Notary Public

JOANNE DEPALMA *San Francisco*
NOTARY PUBLIC - STATE OF NEW YORK
NO. 01DE6192507
QUALIFIED IN SUFFOLK COUNTY
COMMISSION EXPIRES SEPTEMBER 2, 2024

E&A RESTORATION INC

Accounts Receivable Aging by Job

As of 3/31/2023

		Total w/o Retainage	0-30 days	31-60 days	61-90 days	>90days	Retainage
16-002	DDC 253 Broadway	1,407,341.56	975,849.17	117,506.56	313,985.83	-	1,650,445.65
18-007	Nassau County Police Academy	46,217.25	46,217.25	-	-	-	192,789.29
19-005	Nassau County Matrimonial Court	8,187,954.51	5,533,759.46	-	2,654,195.05	-	3,588,358.05
21-014	Nassau County Pool House	85,905.00	42,480.00	43,425.00	-	-	181,595.47
21-016	PSEG 4XH Glenwood	391,130.67	-	-	-	-	97,954.98
21-018	Altice (all 3 combined)	673,229.99	-	-	-	-	-
NCREQ							
19-007	WO6 SECURITY DOORS	35,368.96	35,368.96	-	-	-	-
20-002	WO8 240 OCR						
	Totals:	10,827,147.94	6,633,674.84	160,931.56	2,968,180.88	-	5,711,143.44



E&A RESTORATION INC.
dba E&A CONSTRUCTION

130 Crossways Park Drive, Suite 101
Woodbury, N.Y. 11797



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COMPANY HISTORY AND EXPERIENCE

E&A RESTORATION INC. IS A FULL-SERVICE GENERAL CONTRACTING AND CONSTRUCTION MANAGEMENT FIRM SERVING THE PRIVATE INDUSTRY AND PUBLIC WORKS ON LONG ISLAND AND THE GREATER NEW YORK AREA FOR OVER 20 YEARS.

LICENSED, INSURED, AND BONDED, OUR COMPANY HAS COMPLETED VARIOUS SUCCESSFUL PROJECTS. OUR EXPERIENCE INCLUDES NEW CONSTRUCTION, RETROFIT, INTERIOR FIT-OUT, AND LANDMARK RESTORATION.

OUR COMPLETED PROJECTS INCLUDE EDUCATIONAL FACILITIES, MEDICAL AND FORENSIC LABORATORIES, UTILITIES, ATHLETIC FACILITIES, INSTITUTIONAL, RESIDENTIAL AND COMMERCIAL RETAIL & OFFICE SPACE.

OUR PROJECTS HAVE BEEN COMPLETED ON TIME, WITHIN BUDGET, AND OF EXCEPTIONAL QUALITY AND CRAFTSMANSHIP.

WHAT SETS US APART FROM OUR COMPETITION IS THAT CLIENT SATISFACTION IS PARAMOUNT. WE PROVIDE VARIOUS SERVICES AND REACT IMMEDIATELY TO OUR CLIENT'S CONCERNS.

OUR FOCUS ON SAFETY, BUDGET, SCHEDULE, AND QUALITY CRAFTSMANSHIP HAS EARNED E&A RESTORATION INC. A REPUTATION FOR RELIABILITY, QUALITY, AND RESPONSIVENESS.

OUR CURRENT EMR RATING IS 0.85.



OUR SERVICES

E & A RESTORATION PROVIDES A COMPLETE RANGE OF CONSTRUCTION SERVICES FROM INCEPTION THROUGH PROJECT CLOSEOUT.

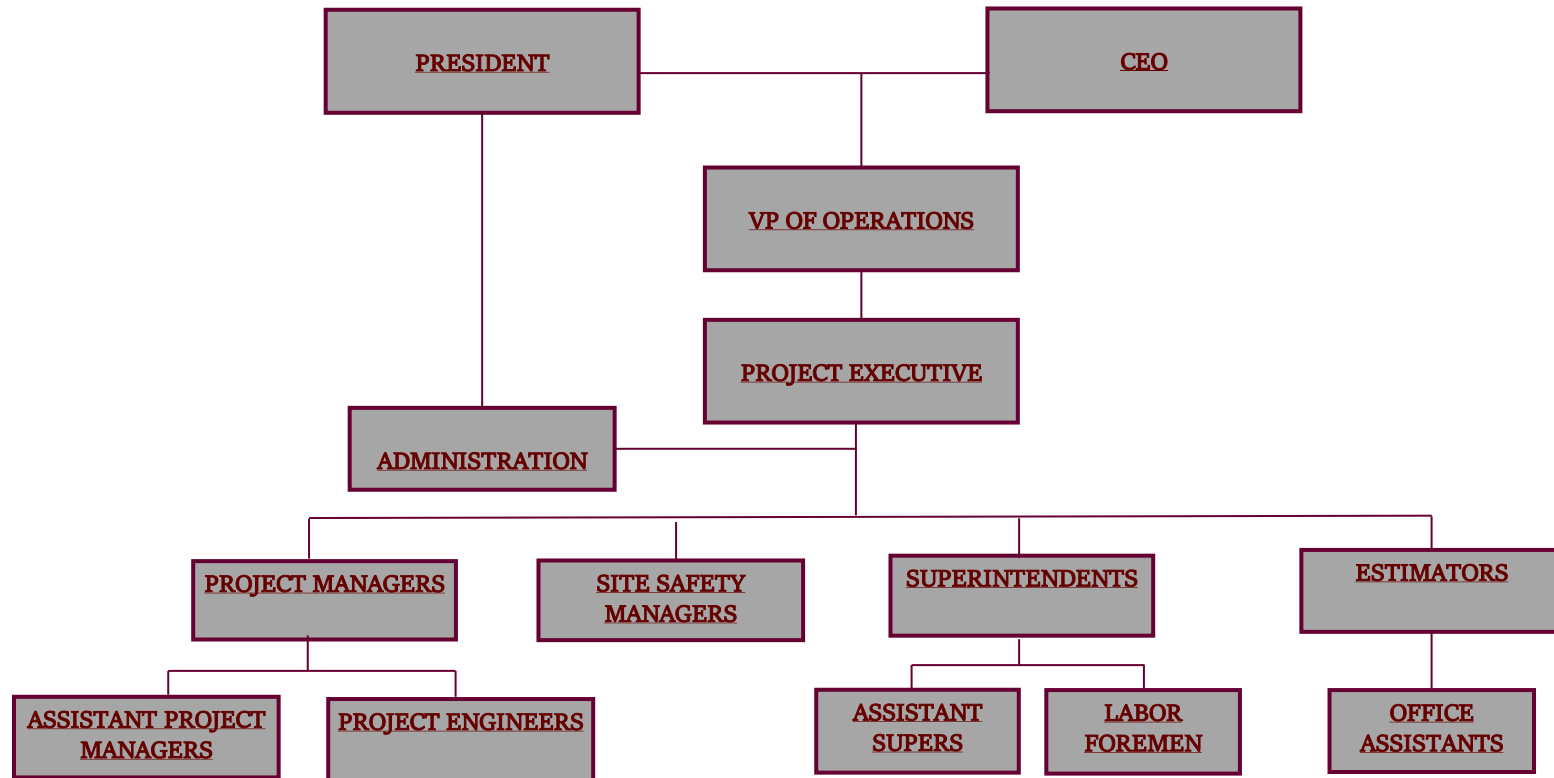
- GENERAL CONSTRUCTION
- CONSTRUCTION MANAGEMENT
- PROGRAM MANAGEMENT
- INSPECTION SERVICES
- QUALITY CONTROL
- VALUE ENGINEERING
- RISK ASSESSMENT
- ESTIMATING SERVICES
- CM/GC
- OWNERS REPRESENTATIVE
- PRE-CONSTRUCTION
- LOGISTICS
- CPM SCHEDULING
- PROJECT CLOSEOUT

PERSONNEL EXPERIENCE

OUR FIRM IS COMPRISED OF PERSONNEL WITH VARYING DEGREES OF EDUCATION AND BACKGROUND EXPERIENCE

- ❖ PROFESSIONAL ENGINEERS
- ❖ ARCHITECTS
- ❖ CIVIL ENGINEERS
- ❖ STRUCTURAL ENGINEERS
- ❖ CONSTRUCTION MANAGERS
- ❖ BUSINESS MANAGERS
- ❖ BUSINESS ADMINISTRATORS
- ❖ CONSTRUCTION SUPERINTENDENTS
- ❖ CONSTRUCTION SAFETY
- ❖ HUMAN RELATIONS
- ❖ RISK MANAGERS

CORPORATE ORGANIZATIONAL CHART



CORPORATE FACTS

COMPLETED JOBS

NASSAU COUNTY
PUBLIC SAFETY
CENTER,
WESTBURY, NY

NASSAU COUNTY DPW
HEADQUARTERS,
WESTBURY, NY

NASSAU COUNTY
FORENSICS
LABORATORY,
WESTBURY, NY

NASSAU COUNTY
POLICE DEPARTMENT
TRAINING AND
INTELLIGENCE
ACADEMY,
HEMPSTEAD, NY

NASSAU COUNTY
FAMILY AND
MATRIMONIAL COURT
HOUSE,
MINEOLA, NY

NASSAU COUNTY
REQUIREMENTS
CONTRACT, VARIOUS
LOCATIONS

NASSAU COUNTY
RESTORATION OF
THEODORE
ROOSEVELT COURT
HOUSE-MINEOLA, NY

NASSAU COUNTY
RESTORATION/MAKE
SAFE OPERATIONS
HEMPSTEAD HOUSE
AT SANDS POINT, NY

NASSAU COUNTY
AQUATIC CENTER –
EISENHOWER PARK,
NY

NASSAU COMMUNITY
COLLEGE,
GARDEN CITY, NY

NASSAU COUNTRY
CLUB POOL HOUSE,
GLEN COVE, NY

PSEG LONG ISLAND –
DEMOLITION OF THE
GLENWOOD SUBSTATION
TRANSFORMER
BUILDING
GLEN HEAD, NY

SUFFOLK COUNTY
COMMUNITY
COLLEGE,
SELDEN, NY

211 EAST 70TH STREET
FAÇADE
RESTORATION,
NEW YORK, NY

845 3RD AVENUE
RETROFIT,
3RD AVENUE, NY

NYC-DDC
253 BROADWAY
INTERIOR
RENOVATIONS,
NEW YORK, NY

NYC-DDC-DOC SECURE
DETENTION FOR
JUVENILES' INTERIM
FACILITY AT
HORZION, BRONX, NY

UNITED STATES PARKS
DEPARTMENT
RESTORATION
SAGAMORE HILL -
THEODORE ROOSEVELT
RESIDENCE

AGRICULTURAL
SOCIETY OF QUEENS,
NASSAU & SUFFOLK
COUNTIES INC.-OLD
BETHPAGE VILLAGE
RESTORATION

TRADES SELF PERFORMED

UNDER THE WATCHFUL EYES OF OUR EXECUTIVE STAFF, E&A'S TEAMS OF PROJECT MANAGERS, SUPERINTENDENTS, OFFICE ENGINEERS, AND ADMINISTRATIVE ASSISTANTS MANAGE OUR PROJECTS.

IN ORDER TO MAINTAIN OUR HIGH DEGREE OF SITE SAFETY, GENERAL SITE MAINTENANCE AND HOUSEKEEPING, E&A EMPLOYS A STAFF OF LABORERS AND CARPENTERS UNDER THE WATCHFUL EYE OF EXPERIENCED FOREPERSONS.

OUR CLIENTS



NASSAU COUNTY POLICE DEPARTMENT
LT. JOHN KILFOIL, OWNER'S REP.
TEL: 516-573-7500



NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
MESSRS. JOSEPH AMERIGO & MICHAEL PULEO
TEL: 516-571-6917



NASSAU COMMUNITY COLLEGE
MR. ROBERT JAROCKI
TEL: 516-572-9786



RUDIN MANAGEMENT COMPANY
MR. PAUL MANDEL
TEL: 212-407-2504



NYC DDC DEPARTMENT OF DESIGN AND CONSTRUCTION
MR. MARK H. FORRESTER
TEL: 917-417-4133



SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS
MR. JAY ABBOTT
TEL: 631-852-4010



ALTICE USA
MR. WOODROW MOST
TEL: 631-935-2396



THE AGRICULTURAL SOCIETY (AgS)
MR. GARY HAGLICH
TEL: 516-808-7915



AHRC NASSAU
MR. JAMES VAN EPPS
TEL: 516-626-1075



NATIONAL PARK SERVICE
CONTRACT NO. SAHI-077375
TEL: 303-969-2344



SUFFOLK COUNTY COMMUNITY COLLEGE
MR. PAUL COOPER
TEL: 631-451-4000

FEATURED PROJECT

PROJECT TITLE: NASSAU COUNTY POLICE ACADEMY
FOR INTELLIGENCE AND TRAINING

COMPLETION DATE: SPRING 2023

CONTRACT AMOUNT: \$42,973,000.00

CONTRACT STATUS: CONSTRUCTION IS COMPLETE WITHIN
BUDGET AND SCHEDULE.

OWNER: NASSAU COUNTY POLICE DEPARTMENT
LT. JOHN KILFOIL, OWNER'S REP.
TEL: 516-573-7500

ARCHITECT: SPECTOR GROUP
MR. ARTHUR JOHNSON, ARCHITECT
TEL: 516-365-4240



DESCRIPTION: THE NEW NASSAU COUNTY POLICE DEPARTMENT CENTER FOR TRAINING AND INTELLIGENCE IS LOCATED ADJACENT TO THE EASTERN MOST AREA OF THE NASSAU COMMUNITY COLLEGE PROPERTY. IT IS ADJACENT TO THE MEADOWBROOK PARKWAY WITHIN THE ENVIRONMENTALLY PROTECTED HEMPSTEAD PLAINS SANCTUARY IN UNIONDALE, NY. THE CONSTRUCTION INCLUDED LAND CLEARING OF A 7-ACRE SITE AND CONSTRUCTION OF A NEW 95,000 SQUARE FOOT FACILITY.

THIS STATE-OF-THE-ART ARCHITECTURALLY SIGNIFICANT STRUCTURE IS HOME TO A HIGHLY TECHNICAL TRAINING FACILITY FOR OFFICER CADETS AND IN-SERVICE OFFICERS.

KEY PROJECT ELEMENTS INCLUDE SITE DEVELOPMENT, INSTALLATION OF NEW DRAINAGE SEWER SYSTEMS AND STRUCTURES, NEW UTILITIES, WITH CONNECTIONS TO EXISTING UTILITY SERVICES LOCATED OFF-SITE AND ROUTED TO THE BUILDING'S UTILITY ENTRY POINTS AND CONNECTED TO THE MAINFRAMES. OTHER SIGNIFICANT FEATURES INCLUDE THE MULTI-STORY MAIN ENTRANCE LOBBY, HIGH TECH CLASSROOMS AND TRAINING EQUIPMENT. A HIGH-TECH MULTI-FUNCTION FOUR HUNDRED SEAT AUDITORIUM WITH FOLDING PARTITIONS. STATE OF THE ART GYMNASIUMS, KITCHENS, AND DINING ROOMS. THERE IS AN EXPANSIVE TACTICAL WAREHOUSE WITH VEHICLE ACCESS AND SECURE ASSET FORFEITURE INTAKE AND STORAGE AREAS.

NASSAU COUNTY POLICE ACADEMY FOR INTELLIGENCE AND TRAINING



FEATURED PROJECT

PROJECT TITLE: NASSAU COUNTY FAMILY AND MATRIMONIAL COURT HOUSE PHASE II

COMPLETION DATE: SPRING 2025

CONTRACT AMOUNT: \$110,000,000.00

CONTRACT STATUS: CONSTRUCTION IN PROGRESS

OWNER: NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
MR. ROBERT LABAW
TEL: 516-571-6804

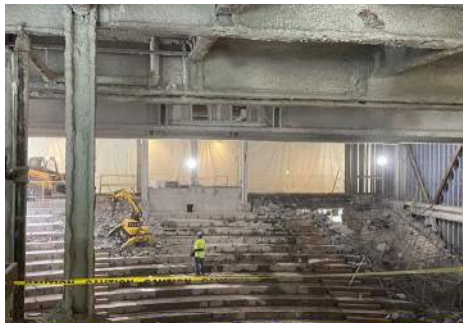
ARCHITECT: SPECTOR GROUP
MR. ARTHUR JOHNSON, ARCHITECT
TEL: 516-365-4240



DESCRIPTION: TEN-ACRE SITE DEVELOPMENT AND RETROFIT OF THE EXISTING 450,000 SF SECURE FACILITY COURT HOUSE.

- REMOVAL OF ALL EXISTING SITE FEATURES, UTILITIES, ROADWAYS AND PARKING LOTS REPLACED WITH NEW STATE OF THE ART UTILITIES, ROADWAYS, PARKING LOTS, COMPLIANT ADA ACCESS, AND NEW LANDSCAPING & IRRIGATION SYSTEMS.
- COMPLETE INTERIOR DEMOLITION AND REMOVAL ALL EXISTING MEPS EQUIPMENT, ELEVATORS, STAIRS, AND STRUCTURAL COMPONENTS. COMPLETE EXTERIOR REMOVAL AND REPLACEMENT OF FACADES AND ROOFS.
- RETROFIT OF THE ENTIRE STRUCTURE WITH NEW INTERIOR STRUCTURAL SYSTEMS, STATE-OF-THE-ART UTILITIES AND ELEVATORS, NEW SHOW CASE AND EMERGENCY STAIR SYSTEMS, NEW UTILITY SERVICES AND ROOMS, MEPS , FIRE ALARM, SECURITY, BMS/BAC, COMMUNICATIONS, IT, AND ACCESS CONTROL SYSTEMS. NEW COURT ROOMS, SECURE JUDGES' CHAMBERS, AND ACCESS ROUTES. NEW OFFICE SPACES, CONFERENCE ROOMS, SECURE DETENTION FACILITIES AND PRISONER TRANSPORTATION ACCESS AREAS. BATHROOMS, KITCHENS, CAFETERIAS, MEDICAL ROOMS, GYMNASIUM AND LOUNGES.
- NEW FURNITURE, FIXTURES, AND EQUIPMENT.

NASSAU COUNTY FAMILY AND MATRIMONIAL COURT PHASE II



FEATURED PROJECT

PROJECT TITLE: NASSAU COUNTY PUBLIC SAFETY CENTER
AND FORENSIC & MEDICAL EXAMINER'S
LABORATORY (POLICE AND FIRE
EMERGENCY 911 COMMUNICATION
CENTER)

COMPLETION DATE: MAY 2019

CONTRACT AMOUNT: \$75,000,000.00

CONTRACT STATUS: COMPLETED WITHIN BUDGET
AND SCHEDULE

OWNER: NASSAU COUNTY DEPARTMENT
OF PUBLIC WORKS
MR. JOSEPH AMERIGO
TEL: 516-571-6804

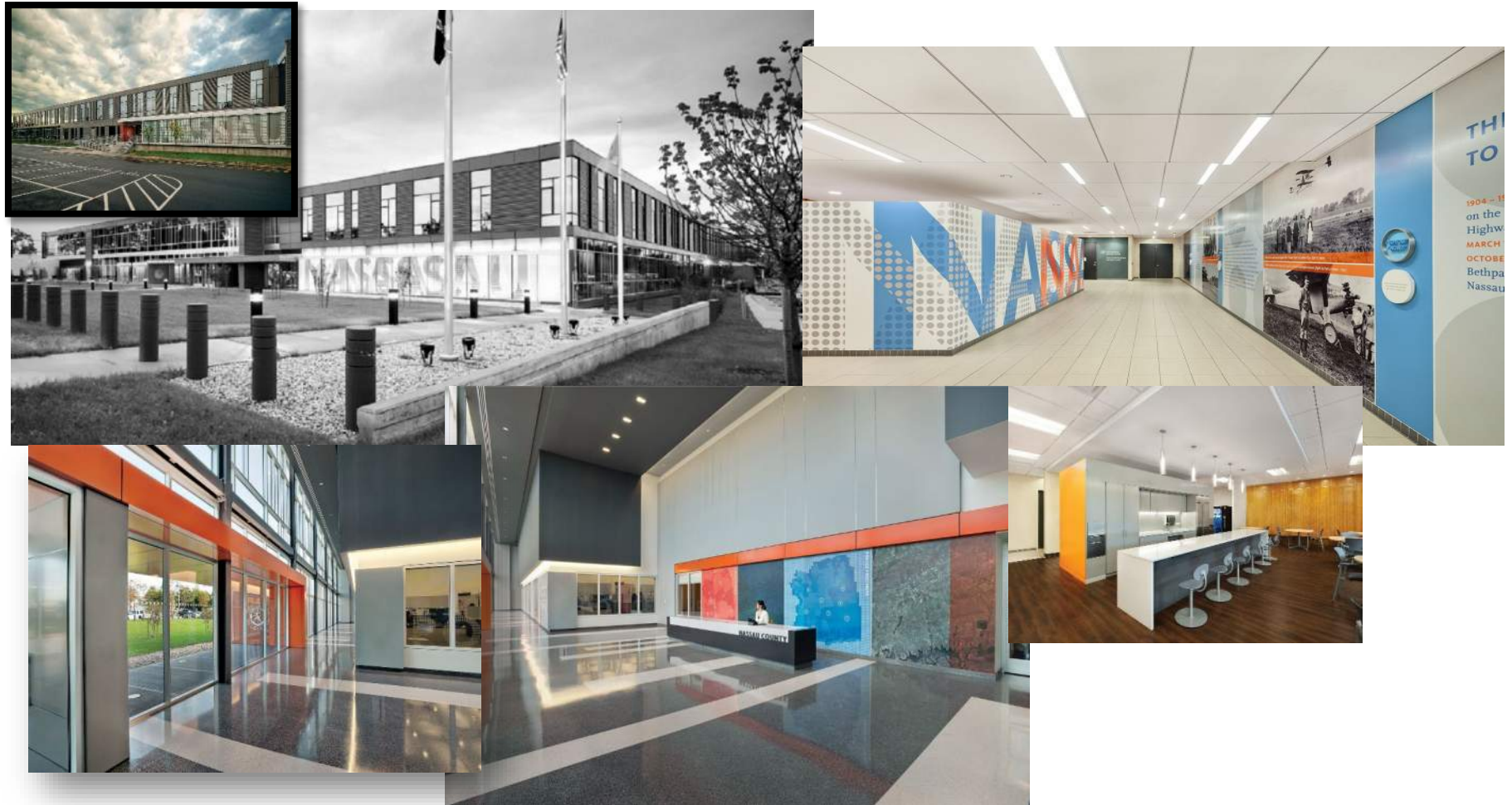
ARCHITECT: SWANKE HAYDEN CONNELL ARCHITECTS
PAUL DESILVA, ARCHITECT
TEL: 212-226-9696



DESCRIPTION: SEVEN-ACRE SITE DEVELOPMENT OF AN OLD ABANDONED 180,000 SF WAREHOUSE ADJACENT TO THE EASTERN SIDE OF THE WANTAGH STATE PARKWAY (WSP). THE EXISTING STRUCTURE WAS SELECTIVELY DISMANTLED AND STRUCTURALLY MODIFIED INTO A NEW STATE OF THE ART 360,000 SF STRUCTURE ON ELEVEN ACRES. 4 ACRES OF LAND WERE RECLAIMED FROM THE ADJACENT WSP RIGHT OF WAY, PIONEERED AND TURNED INTO NEW PARKING LOTS.

- REMOVAL OF ALL EXISTING SITE FEATURES, UTILITIES, ROADWAYS AND PARKING LOTS AND REPLACEMENT WITH NEW STATE OF THE UTILITIES, ROADWAYS, PARKING LOTS, COMPLIANT ADA ACCESS, AND NEW LANDSCAPING & IRRIGATION SYSTEMS.
- RETROFIT OF THE ENTIRE STRUCTURE WITH NEW INTERIOR STRUCTURAL SYSTEMS, STATE-OF-THE-ART ELEVATORS, NEW SHOW CASE AND EMERGENCY STAIR SYSTEMS, NEW UTILITY SERVICES AND ROOMS, MEPS, FIRE ALARM, SECURITY, BMS/BAC, COMMUNICATIONS, IT, AND ACCESS CONTROL SYSTEMS. NEW OFFICE SPACES, COMMUNICATIONS CENTERS, CONFERENCE ROOMS AND LABORATORIES. BATHROOMS, KITCHENS, CAFETERIAS, AND LOUNGES. NEW FURNITURE, FIXTURES, AND EQUIPMENT.
- THIS FACILITY HOUSES THE FOLLOWING AGENCIES IN STATE OF THE ART TECHNICALLY ADVANCED DEMISED SPACES.
 - THE NASSAU COUNTY POLICE AND FIRE DEPARTMENTS' COMMAND AND COMMUNICATIONS 911 CALL CENTER AND EMERGENCY SERVICES HEAVY EQUIPMENT STORAGE AND DISPATCH CENTER
 - THE NASSAU COUNTY MEDICAL EXAMINER'S CRIMINAL FORENSIC LABORATORY
 - THE NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS HEADQUARTERS

NASSAU COUNTY PUBLIC SAFETY CENTER AND FORENSICS LABORATORY



FEATURED PROJECT

PROJECT TITLE: 211 EAST 70TH STREET, NEW RAINSCREEN FAÇADE AND GARDEN RESTORATION

COMPLETION DATE: MAY 2019

CONTRACT AMOUNT: \$75,000,000.00

CONTRACT STATUS: COMPLETED

OWNER: RUDIN MANAGEMENT COMPANY
MR. PAUL MANDEL
TEL: 212-407-2504

ARCHITECT: SKIDMORE, OWINGS & MERRILL
MR. FRANK MAHAN, ARCHITECT
TEL: 212-298-9300

FORST CONSULTING AND ARCHITECTURE, PLLC
MR. RALPH D. FORST, ARCHITECT
TEL: 212-286-0900

DESCRIPTION: THIRTY-FOUR STORY APARTMENT BUILDING WITH FIRST FLOOR LOBBIES AND DOCTORS' OFFICES SITUATED ABOVE A 2-ACRE SUB GRADE PARKING GARAGE WITH PUBLIC ACCESS PARKS ABOVE THE GARAGE AT GRADE LEVEL AND ON BOTH SIDES OF THE BUILDING.

- EXTENSIVE SEVEN MILLION DOLLAR SITE SAFETY AND LOGISTICS PLAN FOR THE STAGING OF VERTICAL EQUIPMENT TO PERFORM THE FAÇADE WORK AND PROTECT THE PUBLIC AND PROPERTY BELOW WHILE ENSURING CONTINUOUS SAFE INGRESS AND EGRESS AT ALL BUILDING PORTALS.
- REMOVAL AND REPLACEMENT OF THE EXISTING FAÇADE AND ROOFING SYSTEMS WITH STATE-OF-THE-ART RAINSCREEN CLADDING AND ROOFING SYSTEMS.
- ALL WORK PERFORMED UNDER FULL OCCUPANCY
- RETROFIT OF THE EXISTING GROUND FLOOR ENTRANCES, LOBBIES, "PORTE' COCHERE," AND GARDENS.
- UPGRADE ALL INCOMING AND OUT FLOWING BUILDING UTILITY SERVICES.



211 EAST 70TH STREET, NEW RAINSCREEN FAÇADE AND GARDEN RESTORATION



FEATURED PROJECT

PROJECT TITLE: SECURE DETENTION FOR JUVENILES
INTERIM FACILITY AT HORIZON
MAKE READY 2

COMPLETION DATE: NOVEMBER 2019

CONTRACT AMOUNT: \$45,000,000.00

CONTRACT STATUS: COMPLETED

OWNER: NYC DEPARTMENT OF DESIGN
AND CONSTRUCTION DIVISION OF
PUBLIC BUILDINGS
MRS. REBECCA CLOUGH
TEL: 718-391-1556

ARCHITECT: URBAHN ARCHITECTS
TEL: 212-239-0220
WWW.URBAHN.COM

DESCRIPTION: EXISTING FACILITY RETROFIT – 90,000 SF

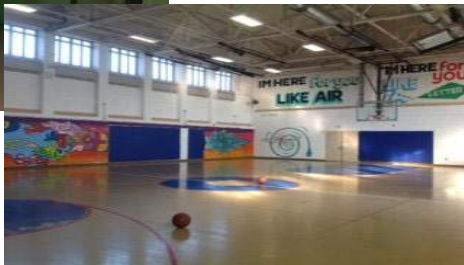


THIS SCOPE OF WORK WAS PERFORMED WHILE THE SECURE DETENTION FACILITY WAS IN CONTINUOUS 24 HOURS PER DAY 7 DAYS PER WEEK OPERATION. THIS IS A GENDER SEGREGATED FACILITY.

THE SCOPE OF WORK INCLUDED SELECT INTERIOR AND EXTERIOR DEMOLITION FOR REBUILDING OF A “HARDENED” FACILITY. THE FACILITIES ORIGINAL CONSTRUCTION WAS NOT HARDENED TO THE NY DEPARTMENT OF CORRECTIONS (DOC) STANDARD, HENCE THE RETROFIT TO ENSURE INDESTRUCTIBLE AREAS WITH SUPREME SECURITY SYSTEMS.

THIS WORK INCLUDED RECONSTRUCTION OF THE EXISTING PLAYGROUNDS AND GARDEN AREAS. RECONSTRUCTION OF THE ROOF SYSTEMS, CLASSROOMS, DORMITORIES, CONTROL CENTERS, MEDICAL ROOMS, BATHROOMS, GYMNASIUMS, LAUNDRY ROOMS, COMMUNICATIONS CENTERS, MULTI-PURPOSE ROOMS, KITCHENS, CAFETERIAS, AND LOUNGES. CONTROLLED INGRESS AND EGRESS SYSTEMS AND INTAKE AREAS. SEPARATED SECURE FACILITIES FOR VISITATION ROOMS, AND SECURE FACILITIES FOR DOC OFFICERS, ADMINISTRATORS AND MEDICAL STAFF.

HORIZON JUVENILE CENTER



FEATURED PROJECT

COMPLETED LANDMARK RESTORATION



THE HEMPSTEAD HOUSE SANDS POINT, NY



THEODORE ROOSEVELT EXECUTIVE BUILDING, MINEOLA, NY



THEODORE ROOSEVELT RESIDENCE, SAGAMORE HILL, NY

OTHER FEATURED PROJECTS



MERRICK HOOK AND LADDER, MERRICK, NY



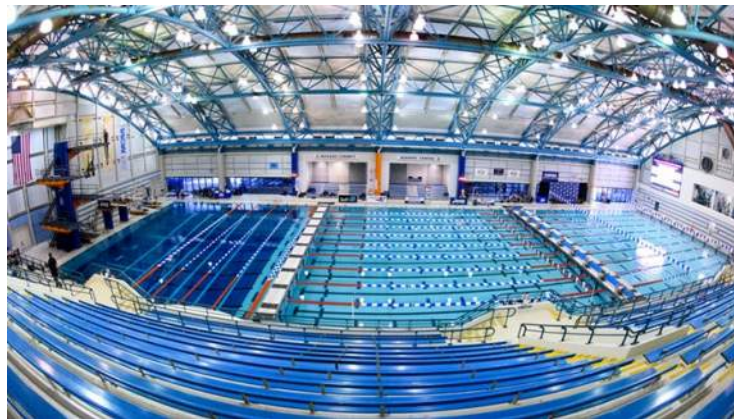
NUNLEY'S CAROUSEL, GARDEN CITY, NY



STERLING GLEN RESIDENCE OF ROSLYN, ROSLYN, NY



BAYVILLE BRIDGE, BAYVILLE, NY



NASSAU COUNTY AQUATIC CENTER AT EISENHOWER PARK, EAST MEADOW, NY



NASSAU COMMUNITY COLLEGE, GARDEN CITY, NY



FOR ADDITIONAL INFORMATION, PLEASE FEEL FREE TO CONTACT OUR TEAM



130 Crossways Park Drive, Suite 101
Woodbury, N.Y. 11797

Tel: 516-921-7030
Fax: 516-921-0259

EMAIL ADDRESS: info@earestoration.com

WEBSITE: www.eandaconstruct.com



James W. Sorge, P.E.
Project Executive

E&A RESTORATION INC.

Education

*Manhattan College, Civil
Engineering*

Licenses/Registrations

*Professional Engineer-State
of New York*

*Licensed Superintendent-
NYC Dept. of Buildings*

*Years With This Firm: 3
Years with Other Firms: 33*

Professional Profile

James is a New York State Professional Engineer and licensed superintendent with over 36 years of experience in construction project management, supervision, and safety. James has a strong background in building and heavy construction, site work and construction logistics. His project experience includes many notable structures throughout the New York Metropolitan Area and Long Island. He is an exceptional leader with strong leadership skills, an incomparable coaching trait which make him asset to any setting.

Experience

E&A Restoration Inc., Project Executive

Supervision of all construction activities.

Direction and coordination of subcontractors and field crews.

- 253 Broadway, New York, NY LPC Office Space Retrofit, NYCDDC
- Nassau County Police Department Center for Training & Intelligence
- Nassau County Family Matrimonial Courthouse

Petracca and Sons Inc., Vice President/General Superintendent

Supervised/Managed the pricing, scheduling, and construction of the following projects:

Projects include:

NYCSCA - P.S 335

Queens, New York
Contract #C000013929
Contract Amount: \$70,858,000

NYCSCA - P.S 798

Brooklyn, New York
Contract #C000010300
Contract Amount: \$50,850,000

New York City School Construction Authority

800 Bed Addition Rikers RMSC
Long Island City, New York
Contract #20050016107
Contract Amount: \$73,430,000

NYCSCA - P.S. 253

Queens, New York
Contract #C000008909
Contract Amount: \$42,490,000

NYCSCA - P.S. 234

Queens, New York
Contract #C000008654



Contract Amount: \$41,619,000
New York City School Construction Authority

James Sorge, P.E. ...cont'd

E&A RESTORATION INC.

NYCSCA - P.S. 69

Brooklyn, New York
Contract #C000008083
Contract Amount: \$34,800,000
New York City School Construction Authority

NYCSCA - P.S. 340

Bronx, New York
Contract #C000007666
Contract Amount: \$18,395,000

Richmond Hill Yard & Shop Improvements

Contract #5631
Contract Amount: \$22,750,000
Long Island Rail Road – MTA (Owner)

Morse Diesel International – Construction Manager

Terminal One: Elevated Roadway
Contract #2172901
Contract Amount: \$10,750,000
Terminal One Group Associates (T.O.G.A) – Owner

New Queens Civil Courthouse

Jamaica, New York
Contract Amount: \$41,830,000
Dormitory Authority – New York State

Reconstruction on the LIE at Sagtikos Parkway

Contract Amount: \$26,900,000
Department of Transportation – New York State

Construction of a Communicable Disease Unit, Phase II

Rikers Island, New York
Contract #072930001 CBP
Contract Amount: \$41,750,000
Department of Correction – New York City

Construction of a Communicable Disease Unit, Phase I

Rikers Island, New York
Contract #072920116 CBP
Contract Amount: \$15,000,000
Department of Correction – New York City



James Sorge, P.E. ...cont'd

E&A RESTORATION INC.

Sprung Structures

Rikers Island, New York

Contract Amount: \$72,400,000

Department of Correction – New York City

Construct twenty-three Emergency Sprung Structures, Chain Link Security Fence, Office Trailer, Toilet/Shower Trailer, Support Modular Trailer and Sitework for the Sprung Structures Complex.

All Work Completed on Time – 75 Days

(July 30th to October 13th, 1991)

Sprung Structures

Rikers Island, New York

Contract Amount: \$35,700,000

Department of Correction – New York City

Supervised site and utility work for construction of 20 emergency inmate housing and support structures.

All work completed on time – 60 to 90 days

(January to Mid-March 1991)

Reconstruction on the LIE at Route 106

Contract Amount: \$35,000,000

Department of Transportation – New York State

Construct five bridges, 400,000 C.Y. of Embankment, Sheeting, Drainage, Rehabilitation of four bridges, Sitework, Paving.

Reconstruction on the LIE

Contract Amount: \$10,000,000

Department of Transportation – New York State

Construct two Pedestrian Bridges, Widen Expressway, Drainage, Sitework, Concrete Barrier



E&A RESTORATION, INC.

John P. O'Donnell Jr.
*Senior Superintendent
Construction Project Manager*

Education

Cape Cod Community College, Associates in Construction Management & Technology

4 Year Carpenter Apprenticeship Program

Licenses/Registrations

-OSHA Life and Health Training
-10 Hour and 30 Hour OSHA Safety Training
-Confined Space Training
-Qualified Compliance Inspector of Storm Water
-Long Island Railroad, Roadway Worker Protection Training

Professional Profile

John has over thirty years of construction experience. He is a seasoned Superintendent and construction project manager who has overseen projects small and large for public agencies, institutions and government entities. John's biggest strength is in delivering on time high quality work while maintaining a safe work environment. His excellent problem solving and coordination skills, scheduling experience and ability to work closely with subcontractors and clients make him a great asset.

Experience

E&A Restoration Inc., Senior Superintendent and Construction Project Manager
Nassau County Police Academy and Nassau County Requirements Contract

Superintendent for the Horizon Juvenile Detention Facility Project for the New York City Department of Design & Construction.

Fortunato Sons Contracting, Project Superintendent

Project Superintendent responsible for the following projects:

- Roosevelt High School New Construction of Library and Gymnasium, \$35M
- LIRR Babylon Station Train Wash Facility and Track Replacement, \$25M
- Westhampton Beach High School New Construction of Two-Story Classroom and State of the Art Theater and Music Wing, \$25M
- Long Island Railroad (LIRR) Wantagh Station Platform Replacement, \$24M
- SUNY Stony Brook Prichard Pool Renovation, \$8M
- US Department of Transportation, Federal Aviation Administration, Northeast Regional Center Construction of Security Building, Mechanical Upgrades
- Smithtown Middle School New Construction of Music Wing and Gymnasium, Renovations
- William Floyd Elementary School New Construction Classroom Wing
- LIRR Garden City Station Construction Storage Facility

Assistant Superintendent responsible for the following projects:

- LIRR Port Jefferson Station Construction of Ten Track Train Yard
- LIRR Hempstead Station Construction of Train Platform and Track Replacement

Carpenter Foreman for the following projects:

- Pilgrim State Psychiatric Hospital Building Renovations
- Grumman Aerospace Corp. Calverton Hangar Construction

Nastashi White, Carpenter

- Computer Associates Construction of Headquarters
- St. Charles Hospital New Construction



Joseph Mastanduno
Project Manager

E&A RESTORATION, INC.

Education

*Rensselaer Polytechnic
Institute
BS Civil Engineering*

Licenses/Registrations

*Professional Engineer State
of New York
OSHA 10 & 30
Scaffolding Safety Training*

Years With This Firm: 9

Professional Profile

Joseph's formal education from a highly prestigious engineering school gives him a unique insight into the interpretation & understanding of contract specifications as well as knowledge of construction standards & safety practices. Joseph has a strong understanding of construction materials & design calculations. It is this and many other reasons that he is an asset to our firm. His education, practical design knowledge and leadership skills make him an outstanding Project Manager on our projects.

Experience

E&A Restoration Inc., Project Manager
Nassau County Police Department Center for Training and Intelligence
Construction of a new, state of the art, 3 story, steel framed building.

E&A Restoration Inc., Project Manager
Horizons Juvenile Center Make Ready 2
\$66 Million emergency contract on a state-mandated finish date due to the new NYS Raise the Age Law.

E&A Restoration Inc., Project Manager
Nassau County Public Safety Center Phase III, Forensic Laboratory
Responsible for coordinating the day-to-day operations of the jobsite, including verifying dimensions & connection details, interpreting project specifications, and organizing work in the field for maximum efficiency. Responsibilities also include logging all documentation for the project including submittals, RFIs, written agreements and formal letters, as well as preparing submittals and details for review by the owner's representative & EOR. Duties also include working directly with the Project Superintendent to coordinate and schedule upcoming work and review all shop drawings and submitted details for accuracy.

E&A Restoration Inc., Assistant Supervisor
Suffolk Community College, Riverhead Building Renovation
As assistant supervisor on this fast paced \$12,750,000 project, duties included coordinating work schedules between the various trades on a daily basis, keeping track of daily construction crews of up to 60 people, and preparing daily reports.

E&A Restoration Inc., Assistant Estimator
Duties included contacting subcontractors for bids on potential projects, performing quantity take-offs from floor plans, electrical drawings, mechanical drawings, assembling bids and attending bid meetings.

E&A Restoration Inc., Intern
Observe and learn the activities and responsibilities of construction management staff. Education in daily reports, safety, progress tracking, and building systems for an efficient construction operation.



Azela Nunez
Office Engineer

E&A RESTORATION, INC.

Education

*Farmingdale University
Construction Management*

Software Proficiency

*Expedition/Primavera
Prolog Project Management*

*Years With This Firm: 3
Years With Other Firms: 30*

Professional Profile

Azela has over 30 years of construction experience work for URS Corp. and the NYS Department of General Services. As an Office Engineer, she excelled in her duties, achieving both an employee recognition award and employee of the year honors for her commitment to her duties. She has worked her way up to Assistant Project Manager.

Experience

E&A Restoration Inc.,
Office Engineer

Duties include the office administrative management of several ongoing construction projects in their entirety, including manpower reports, expenses, budget, purchasing and project coordination.

URS Corporation

Office Engineer

Experience includes the World Trade Center Transportation HUB Project, a \$2.2 Billion reconstruction of the PATH Station, Freedom Tower construction, Towers 2, 3, & 4 construction, performing arts center and retail development projects. Duties included review of T&M tickets for work provided, ensuring all was in accordance with contract documents. Auditing was performed with all data input into a data entry system. Working with programmers, data entry clerks and the on-site project management team, the document management system was utilized to ensure payments were within contract requirements. Change Orders, contractor claims, and project closeout functions were performed efficiently due to the file management system utilized.

NYC Department of General Services

Working as an office engineer and project administrator for DSG, her work included input and maintenance of show drawings, RFI, change order, contractor payment, meeting minutes M/W/DBE requirements, correspondence folders, etc.

Representative Projects

World Trade Center Transportation Hub Project and Other World Trade Center Site Projects

Office Engineer for the WTC Transportation Hub Project. PB URS as part of a joint venture is providing construction management services to the PANY&NJ for the World Trade Center Transportation Hub Project being built to replace the temporary PATH station under the World Trade Center that was destroyed on September 11th, 2001. This PATH station is the major transportation Hub Project being built to replace the temporary PATH station under the World Trade Center that transports New Jersey commuters to lower Manhattan and visa versa.

The World Trade Center Transportation Hub Project includes:

- Site Preparation and Underpinning of #1 and #9 subway lines
- Path Facilities (Tracks, Platforms, Mezzanine)
- Pedestrian Connections (North/South & East/West)
- Street Entries



Azela Nunez

Office Engineer

Continued...

E&A RESTORATION INC.

Other World Trade Center project include:

- Freedom Tower
- Towers 2, 3 & 4
- WTC Memorial Museum and Cultural Project
- Common Infrastructure Projects (security center, new streets, central heating & refrigeration plant)
- Performing Arts Center and retail development

Construction management tasks include QA/QC, inspection services, preconstruction phase services, support services, technical services, site safety monitoring, scheduling, cost management, document control, cost estimating, site construction, logistics, project closeout, environmental reporting and coordination with NYCDOT/NYS DOT, New York City Transit, Lower Manhattan Development Corporation, NYC Department of Environmental Protection, Con Edison, FTA, and local businesses and communities.

As the office engineer for the East Bathtub my overall function was to assist the entire project team including the Engineer of Construction, Resident Engineers, Assistant RE's, Inspectors and Project Controls Manager on this project (Interact with all levels of PANYNJ staff, upper management, CM, contractors, subcontractors, outside agencies). Primary responsibilities includes: performing desk audits (according to the contractor's contract, knowledge of the labor relation agreement and blue book) of the Time and Material tickets and extra work tickets for the contractor (Phoenix and Tutor Perini) as well as subcontractor invoices (time, labor and material, and trucking) Provide audit functions and reviews/disputes; organizing all T&M tickets into a data entry system (Microsoft Access) for both the East, West Bathtubs and General Conditions, including the supervision, guidance, development and maintenance of the Material, Equipment & Labor (MEL) costs with the assistance of an outside programmer consultant and two data entry clerks (effectively coordinate multiple tasks/assignments). MEL helps generate accruals, facilitate payments and reporting. Additional responsibilities include: assisting and preparing documentation for change order (PPIN/PACC) or claims by reviewing and evaluating change order request or claims (Develop claim justification, entitlement, or denials rebuttals), maintaining records on unit price quantities for material, labor, and equipment, perform estimates for extra work and credits, managed progress payments, coordinate field staff/scheduling coverage and the distributing of T&M tickets. Proactive identifying potential problems/discussing resolutions before they become an issue, establish, and manage closeout process



Azela Nunez

Office Engineer

Continued...

E&A RESTORATION INC.

New York City Housing Authority (NYCHA), Far Rockaway, NY (6/2005 -12/2005) -

\$60,000,000: As the Office Engineer for the NYCHA project involving the renovation of the apartment units at the Ocean Bay Apartments - HOPE VI Revitalization. Duties included creation, update and maintenance of logs, spreadsheets and databases of all incoming and outgoing correspondence; transmittals; meeting minutes; Notice of Non Conformance; reports; agendas; RFIs; RFPs; specifications; submittals; sketches; shop drawings, requisition, distribution as well as developing and maintaining a filing system for 13 contracts. This also includes managing cost control, bidding, contract administration, change order negotiation and processing monthly requisitions for all contracts.

John F. Kennedy International Airport Redevelopment Program, Jamaica, NY (8/2003 - 6/2005) - \$10,000,000,000: As the Project Administrator for the Port Authority of NY & NJ (PANY&NJ) Affirmative Action Office, responsibilities included performing administrative functions including: preparation of M/WBE participation plan submissions and approvals for AAC review; quarterly and year-to-date M/WBE tenant construction activity reports for LGA and JFK airports; review of tenant/contractor major projects monthly reporting for consistency with plans, awards and payments, architect and engineering activity; maintenance of current listing of contractors that have obtained PANY&NJ contract documents for bidding purposes and of low bidders on PANY&NJ contracts; at the end of each quarter developed and published a schedule of contracts for bid for the upcoming quarter; follow-up with tenants in developing their M/WBE plans and to acquire payment information prior to final payments; and assisted in developing and conducting community outreach activities. Creation, update and maintenance of listings, spreadsheets and databases. Attended pre-construction meetings; assisted AAC in conducting periodic site visits of PANY&NJ and tenant construction projects to ensure M/WBE and labor force program compliance. PANY&NJ Affirmative Action Coordination updates, interdepartmental, and major monthly tenant M/WBE project update meetings. Attended other meetings as required. Assisted in maintaining the Business Resource Center at JFK with sets of all contract documents of PANY&NJ and tenant projects to be retained in this Center for review and used by M/WBEs.

Washington Mutual Bank, New York, NY (8/2002 8/2003) \$20,000,000:

Coordinator for the Washington Mutual Project responsibilities included supporting multiple contractors and vendors and providing coordination and support to construction managers, NE and client. Responsibilities also included the projects Document Control Administration, invoicing, reports and project tracking.



Azela Nunez

Office Engineer

Continued...

E&A RESTORATION INC.

Brooklyn Court House / General Post Office, Brooklyn, NY (7/2001 8/2002):

Senior Project Administrative Assistant for a (GSA) \$250 million 632,000 SF 15 story U.S. Federal Courthouse consisting of 25 courtrooms and a \$161 million U.S. General Post Office Project which consisted of the renovation of an 8 story historic 488,000 SF Post Office and a 4-story 87,000 SF expansion and renovation of separate wing into courtrooms and facilities, responsibilities included taking and processing biweekly minutes of meeting, monitoring all incoming and outgoing correspondence; transmittals; meeting minutes; Notice of Non Conformance; reports; agendas; RFIs; RFPs; specifications; submittals; sketches; shop drawings, requisition, distribution as well as file maintenance and the screening of telephone calls for the Client (GSA) and Project Staff. It also included the Project Document Control System Administration (Microsoft Access). Performed and oversaw general office support activities and client public relations.

Farley Pennsylvania Station, New York, NY (6/2000 7/2001) \$600,000,000: Administrative Assistant for the significant and high-profile Farley-Penn Station project, responsibilities included managing of the Project Document Control System Administration, supervising one full time Document Control Personnel for the maintenance of the project web site system. Duties also included administration of the Web-site for the meetings, users, audit trail, document library and contacts. Daily activities included managing all correspondence; transmittals; reports; agendas; change orders; RFIs, specifications, meeting minutes, invoicing, as well as file maintenance and screening telephone calls for the Project Executives. Heavy client, consultant and sub-consultant interaction.

St. George Ferry Terminal Renovation, New York, NY (3/1998 6/2000) \$100,000,000: Responsible for managing all correspondence; transmittals; reports; agendas; change orders; RFIs, specifications, meeting minutes, as well as file maintenance and screening telephone calls for the Project Executive and Project Staff. Also responsible for the Project Document Control System Administration and managed and maintained all invoices and requisitions for payments which includes URS' and the Contractors payments. Heavy client and contractor interaction.

Columbia University Campus Improvements, New York, NY (8/1996- 3/1998)-

As Project Administrative Assistant responsibilities included supporting the Project Management Team, and supervising two part-time clerical workers. Daily activities included preparation and review of all correspondence, reports, memorandums, agendas and the managing and maintenance of the URS' invoices as well as screening telephone call for the Project Executive and Project Staff. Was also responsible for the Project Document Control System Administration and the maintenance of an on-line Correspondence Tracking System. Heavy client and contractor interaction was part of my daily routine.



Azela Nunez

Office Engineer

Continued...

E&A RESTORATION INC.

345 Adams Street Exterior Rehabilitation, Brooklyn, NY (4/1995 8/1996) \$12,000,000: As Document Control Clerk, provided office document control system support for the project team working on the exterior rehabilitation of 345 Adams Street, a 12-story building dating back to the early 1920s. Located in downtown Brooklyn, the building is fully occupied by various City departments and agencies including the Civil Court, Board of Elections, Department of Finance, and Human Resources Administration (HRA). Responsibilities included managing office document control system to include input and tracking of all contractor submittals, correspondence, reports, change orders, scheduling, etc., organization and maintenance of files, taking minutes at weekly progress meetings with the owner and contractors; reproduction and distribution of meeting minutes; maintenance of all invoices and requisition for payments. Responsible for general office support. Uses Expedition 4.1, Microsoft Access, Primavera Project Planner, and Lotus to accomplish daily updates.

Cultural Institute, Department of General Services, New York, NY (8/1982 - 1/1995): Served as the Secretary for the Cultural Institute. Heavy typing of correspondence, reports, agenda, specifications, charts on WordPerfect, 5.1, Lotus 123 and Wang. Managed program managers and project managers calendars; scheduled meetings, handled telephone, mail, faxing and weekly timecards.

Department of General Services, New York, NY (8/1982 -1/1995) - \$2,500,000,000: As Word Processor, provided word processing services to the Courts/Programs Unit of the New York City Department of General Services (DGS). Reviewed all the commissioner's confidential correspondence reports, memorandum and agendas, and summarized, processed and distributed them to executive staff. Screened all calls from city agencies/officials and construction managers with a tactful and courteous manner relaying the messages promptly to various bureaus throughout the department. Worked with Lotus 123, QuattroPro for creation of charts and spreadsheets, WordPerfect 5.2 and 6.0 for typing general correspondence, reports, agendas and specifications.



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

EQUIPMENT LIST

THE FOLLOWING EQUIPMENT IS LOCATED AT:

E & A RESTORATION INC.
130 CROSSWAYS PARK DRIVE
WOODBURY, NY 11797

VANS, DUMPTRUCKS, PICKUP TRUCKS SCAFFOLDING, BOB CAT
GAS SAWS, GENERATORS, WELDING MACHINES, COMPACTOR, CHIP GUNS,
GRINDERS
CONCRETE CHUTE, LIGHTING, KETTLES, TRAILERS, KICKERS, VIBRATOR, CONEX
CONTAINERS, COMPRESSORS



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

April 03, 2023

Nan (Christine) Sandar, Analyst-Procurement
30-30 Thomson Avenue, First Floor
Long Island City, NY 11101
(P)718-391-2449

Project: SANDBOMB –NYPD Bomb Squad Building

RE: Key Material Suppliers

Dear Nan (Christine) Sandar,

The following is a list of our key material suppliers for the above-referenced project.

Kamco
506 West 21st Street
New York, NY 10011
718-768-1234

Marjam
20 Rewe Street
Brooklyn, NY 11211
718-388-6465

Park Avenue Building Supply
525 Park Avenue
Brooklyn, NY 11205
718-403-0100

If you should have any questions or require anything further, please do not hesitate to call our office.

Regards,

Giovanni Oliveri
E&A Restoration Inc.



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

April 03, 2023

Nan (Christine) Sandar, Analyst-Procurement
30-30 Thomson Avenue, First Floor
Long Island City, NY 11101
(P)718-391-2449

Project: SANDBOMB –NYPD Bomb Squad Building

RE: Potential Subcontractors

Dear Nan (Christine) Sandar,

The following is a list of work we expect to be subcontracted for the above-referenced project.

- Sitework
- Piles
- Utilities
- Concrete
- Masonry
- Structural Steel
- Millwork
- Roofing
- Metal Panels
- Flooring
- Waterproofing
- Elevator
- Fire Suppression
- Plumbing
 - Par Plumbing
60 N Prospect Ave
Lynbrook, NY 11563
- HVAC
 - Dierks Heating Company, INC.
43-32 33 Street
Long Island City, NY 11101
- Electrical
 - Mid City Electrical Corp.
2190 McDonald Avenue
Brooklyn, NY 11223



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If you should have any questions or require anything further, please do not hesitate to call our office.

Regards,

Giovanni Oliveri
E&A Restoration Inc.

Activity ID	Activity Name	Duration (wds)	Planned Start	Planned Finish	2023												2024												2025											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov					
NYPD Bomb Squad Building																																								
Milestones																																								
M1000	DDC Issue Notice To Proceed	0	05-01-23		◆ DDC Issue Notice To Proceed																																			
M9900	Substantial Completion	0		04-18-25*	◆ Substantial Completion																																			
DUR-01	CONSTRUCTION DURATION = 720 CCDS	720	05-01-23	04-19-25	CONSTRUCTION DURATION = 720 CCDS																																			
Piles, Foundations & Steel																																								
SUMM01	PRECON SUBMITTALS & PERMITS	20	05-01-23	05-26-23	PRECON SUBMITTALS & PERMITS																																			
SUMM40	MOBILIZATION	10	05-30-23	06-12-23	MOBILIZATION																																			
SUMM50	EXISTING BUILDING DEMOLITION	40	06-13-23	08-08-23	EXISTING BUILDING DEMOLITION																																			
SUMM100	PILE SUBCONTRACTOR MOBILIZE / TEST PILES	20	08-09-23	09-06-23	PILE SUBCONTRACTOR MOBILIZE / TEST PILES																																			
SUMM60	PILES	20	09-07-23	10-04-23	PILES																																			
SUMM03	EXCAVATION / FOUNDATIONS	70	10-05-23	01-15-24	EXCAVATION / FOUNDATIONS																																			
SUMM90	WATERPROOFING	20	01-16-24	02-12-24	WATERPROOFING																																			
SUMM06	UNDERGROUND MEPS & SOG	20	02-13-24	03-12-24	UNDERGROUND MEPS & SOG																																			
SUMM04	STEEL & DECKING	60	03-13-24	06-04-24	STEEL & DECKING																																			
Building Facade & Roof																																								
SUMM80	EXTERIOR FRAMING / METAL PANELS	80	06-05-24	09-24-24	EXTERIOR FRAMING / METAL PANELS																																			
SUMM70	ROOF	30	09-25-24	11-05-24	ROOF																																			
Interiors																																								
SUMM08	INTERIOR MASONRY	40	06-05-24	07-30-24	INTERIOR MASONRY																																			
SUMM10	INTERIOR PARTITIONS & DOOR FRAMES	110	07-03-24	12-03-24	INTERIOR PARTITIONS & DOOR FRAMES																																			
SUMM09	MEP SYSTEMS ROUGH-IN	200	06-05-24	03-11-25	MEP SYSTEMS ROUGH-IN																																			
SUMM15	ELEVATOR	100	11-06-24	03-25-25	ELEVATOR																																			
SUMM17	INTERIOR FINISHES & EQUIPMENT	190	07-17-24	04-08-25	INTERIOR FINISHES & EQUIPMENT																																			
Sitework / Exterior Improvements																																								
SUMM110	FABRIC STRUCTURE	40	11-06-24	12-31-24	FABRIC STRUCTURE																																			
SUMM20	SITWORK & UTILITIES	130	08-28-24	02-25-25	SITWORK & UTILITIES																																			
SUMM30	MEP SYSTEMS TESTING & COMMISSIONING	20	03-24-25	04-18-25	MEP SYSTEMS TESTING & COMMISSIONING																																			

Project Start: 05-01-23
Project Finish (Contract): 04-19-25

Work Item (Wds)
Milestone

E&A Resoration Inc.
NYPD Bomb Squad Building
PRELIMINARY SCHEDULE
APRIL 3, 2022

Date	Revision	Checked	Approved



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

April 03, 2023

Nan (Christine) Sandar, Analyst-Procurement
30-30 Thomson Avenue, First Floor
Long Island City, NY 11101
(P)718-391-2449

Project: SANDBOMB –NYPD Bomb Squad Building

RE: Financing of Project

Dear Nan (Christine) Sandar,

E&A Restoration Inc's means of financing this project:

- Use of liquid cash from bank account
- Use of funds from available line of credit, if need be

If you should have any questions or require anything further, please do not hesitate to call our office.

Regards,

Giovanni Oliveri
E&A Restoration Inc.

The City of New York Department of Small Business Services
Division of Labor Services Contract Compliance Unit
1 Liberty Plaza, New York, New York 10006
Phone: (212) 513 – 6323
Fax: (212) 618-8879
CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

- 1. Your contractual relationship in this contract is: Prime contractor Subcontractor
- 1a. Are M/WBE goals attached to this project? Yes No
- 2. Please check one of the following if your firm would like information on how to certify with the City of New York as a:
 Minority Owned Business Enterprise Locally Based Business Enterprise
 Women Owned Business Enterprise Emerging Business Enterprise
 Disadvantaged Business Enterprise
- 2a. If you are certified as an **MBE, WBE, LBE, EBE** or **DBE**, what city/state agency are you certified with? _____ Are you DBE certified? Yes No
- 3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities: Yes No
- 4. Is this project subject to a project labor agreement? Yes No
- 5. Are you a Union contractor? Yes No If yes, please list which local(s) you affiliated with 79, 66, 290
- 6. Are you a Veteran owned company? Yes No

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

- 7. 11-3579414 jsakalis@earestoration.com
Employer Identification Number or Federal Tax I.D. Email Address
- 8. E&A RESTORATION, INC.
Company Name
- 9. 130 Crossways Park Drive, Suite 101, Woodbury, NY 11797
Company Address and Zip Code
- 10. _____
Chief Operating Officer Telephone Number
- 11. _____
Designated Equal Opportunity Compliance Officer Telephone Number
(If same as Item #10, write "same")
- 12. _____
Name of Prime Contractor and Contact Person
(If same as Item #8, write "same")

13. Number of employees in your company: 28

14. Contract information:

- | | |
|---|--|
| (a) <u>DDC</u>
Contracting Agency (City Agency) | (b) <u>\$ 22,300,000.19</u>
Contract Amount |
| (c) <u>EPIN: 85023B0022: PROJECT ID:SANDBOMB</u>
Procurement Identification Number (PIN) | (d) _____
Contract Registration Number (CT#) |
| (e) <u>06/01/2023</u>
Projected Commencement Date | (f) <u>05/31/2025</u>
Projected Completion Date |

(g) Description and location of proposed contract:

NYPD BOMB SQUAD BUILDING 100A RODMAN'S NECK PATH PELHAM BAY PARK
BRONX NY 10464

15. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes ___ No X

If yes, attach a copy of certificate.

16. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes ___ No X

If yes, attach a copy of certificate.

NOTE: DLS WILL NOT ISSUE A CONTINUED CERTIFICATE OF APPROVAL IN CONNECTION WITH THIS CONTRACT UNLESS THE REQUIRED CORRECTIVE ACTIONS IN PRIOR CONDITIONAL CERTIFICATES OF APPROVAL HAVE BEEN TAKEN.

17. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate?

Yes ___ No X If yes,

Date submitted: _____

Agency to which submitted: _____

Name of Agency Person: _____

Contract No: _____

Telephone: _____

18. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes ___ No X

If yes,

(a) Name and address of OFCCP office.

(b) Was a Certificate of Equal Employment Compliance issued within the past 36 months?
Yes___ No X

If yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes___ No X

If yes, attach a copy of such requirements or agreements.

(d) Were any deficiencies found? Yes___ No X

If yes, attach a copy of such findings.

19. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes___ No X

If yes, attach a list of such associations and all applicable CBA's.

PART II: DOCUMENTS REQUIRED

20. For the following policies or practices, attach the relevant documents (e.g., printed booklets, brochures, manuals, memoranda, etc.). If the policy(ies) are unwritten, attach a full explanation of the practices. See instructions. SEE ATTACHED

- ___ (a) Health benefit coverage/description(s) for all management, nonunion and union employees (whether company or union administered)
- ___ (b) Disability, life, other insurance coverage/description
- ___ (c) Employee Policy/Handbook
- ___ (d) Personnel Policy/Manual
- ___ (e) Supervisor's Policy/Manual
- ___ (f) Pension plan or 401k coverage/description for all management, nonunion and union employees, whether company or union administered
- ___ (g) Collective bargaining agreement(s).
- ___ (h) Employment Application(s)
- ___ (i) Employee evaluation policy/form(s).
- ___ (j) Does your firm have medical and/or non-medical (i.e. education, military, personal, pregnancy, child care) leave policy?
- ___ (k) Sexual Harassment Policy

21. To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 Form?

- | | | |
|--|--------------|-------------|
| (a) Prior to job offer | Yes ___ | No <u>X</u> |
| (b) After a conditional job offer | Yes ___ | No <u>x</u> |
| (c) After a job offer | Yes ___ | No <u>x</u> |
| (d) Within the first three days on the job | Yes ___ | No <u>x</u> |
| (e) To some applicants | Yes ___ | No <u>x</u> |
| (f) To all applicants | Yes ___ | No <u>x</u> |
| (g) To some employees | Yes ___ | No <u>x</u> |
| (h) To all employees | Yes <u>x</u> | No ___ |

22. Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.

I9's are stored in main office

23. Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination? Yes ___ No X

If yes, is the medical examination given:

- | | | |
|-----------------------------------|---------|--------|
| (a) Prior to a job offer | Yes ___ | No ___ |
| (b) After a conditional job offer | Yes ___ | No ___ |
| (c) After a job offer | Yes ___ | No ___ |
| (d) To all applicants | Yes ___ | No ___ |
| (e) Only to some applicants | Yes ___ | No ___ |

If yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.

24. Do you have a written equal employment opportunity (EEO) policy? Yes X No ___

If yes, list the document(s) and page number(s) where these written policies are located.

25. Does the company have a current affirmative action plan(s) (AAP)

- Minorities and Women
 Individuals with handicaps
 Other. Please specify _____
-

26. Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes ___ No X

If yes, please attach a copy of this policy.

If no, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

27. Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes___ No X

If yes, attach an internal complaint log. See instructions.

28. Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes___ No X

If yes, attach a log. See instructions.

29. Are there any jobs for which there are physical qualifications? Yes___ No X

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

30. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes___ No X

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

SIGNATURE PAGE

I, (print name of authorized official signing) Jenny Sakalis hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a contractual obligation. I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

E&A Restoration Inc

Contractor's Name

Jenny Sakalis

President

Name of person who prepared this Employment Report

Title

Jenny Sakalis

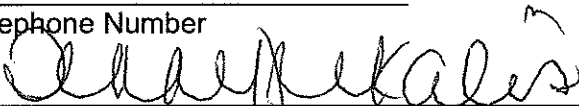
President

Name of official authorized to sign on behalf of the contractor

Title

516-921-7030

Telephone Number



04/04/2023

Signature of authorized official

Date

If contractors are found to be underutilizing minorities and females in any given trade based on Chapter 56 Section 3H, the Division of Labor Services reserves the right to request the contractor's workforce data and to implement an employment program.

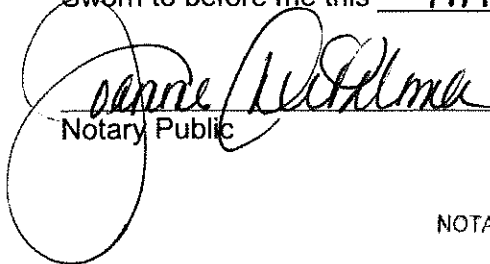
Contractors who fail to comply with the above mentioned requirements or are found to be in noncompliance may be subject to the withholding of final payment.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

To the extent permitted by law and consistent with the proper discharge of DLS' responsibilities under Charter Chapter 56 of the City Charter and Executive Order No. 50 (1980) and the implementing Rules and Regulations, all information provided by a contractor to DLS shall be confidential.

Only original signatures accepted.

Sworn to before me this 4th day of April 20 23



Notary Public

Authorized Signature

4/4/23
Date

JOANNE DEPALMA
NOTARY PUBLIC - STATE OF NEW YORK
NO. 01DE3192507
QUALIFIED IN SUFFOLK COUNTY
COMMISSION EXPIRES SEPTEMBER 2, 2024

FORM A. CONTRACT BID INFORMATION: USE OF SUBCONTRACTORS/TRADES

1. Do you plan to subcontractor work on this contract? Yes No
2. If yes, complete the chart below. SEE ATTACHED

NOTE: All proposed subcontractors with a subcontract in excess of \$750,000 must complete an Employment Report for review and approval before the contract may be awarded and work commences.

SUBCONTRACTOR'S NAME*	OWNERSHIP (ENTER APPROPRIATE CODE LETTERS BELOW)	WORK TO BE PERFORMED BY SUBCONTRACTOR	TRADE PROJECTED FOR USE BY SUBCONTRACTOR	PROJECTED DOLLAR VALUE OF SUBCONTRACT

***If subcontractor is presently unknown, please enter the trade (craft name).**

OWNERSHIP CODES

- W: White
- B: Black
- H: Hispanic
- A: Asian
- N: Native American
- F: Female



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
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Nan (Christine) Sandar, Analyst-Procurement
30-30 Thomson Avenue, First Floor
Long Island City, NY 11101
(P)718-391-2449

Project: SANDBOMB –NYPD Bomb Squad Building

RE: Potential Subcontractors

Dear Nan (Christine) Sandar,

The following is a list of work we expect to be subcontracted for the above-referenced project.

- Sitework
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- Structural Steel
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60 N Prospect Ave
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Regards,


Giovanni Oliveri

E&A Restoration Inc.

FORM B: PROJECTED WORKFORCE TO BE PROVIDED UPON CONTRACT AWARD AND CONSTRUCTION START

TRADE CLASSIFICATION CODES

- (J) Journeylevel Workers
- (H) Helper
- (TOT) Total by Column
- (A) Apprentice
- (TRN) Trainee

For each trade to be engaged by your company for this project, enter the projected workforce for Males and Females by trade classification on the charts below.

Trade:	MALES						FEMALES															
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)			
	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	Native Amer.	
J																						
H																						
A																						
TRN																						
TOT																						

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

FORM B: PROJECTED WORKFORCE TO BE PROVIDED UPON CONTRACT AWARD AND CONSTRUCTION START

Trade: _____

Union Affiliation, if applicable _____

Total (Col. #1-10): _____

Total Minority, Male & Female
(Col. #2,3,4,5,7,8,9, & 10): _____

Total Female
(Col. #6 – 10): _____

	MALES					FEMALES				
	(1) White Non Hisp.	(2) Black Non Hisp.	(3) Hisp.	(4) Asian	(5) Native Amer.	(6) White Non Hisp.	(7) Black Non Hisp.	(8) Hisp.	(9) Asian	(10) Native Amer.
J										
H										
A										
TRN										
TOT										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

FORM C: CURRENT WORKFORCE TO BE PROVIDED UPON CONTRACT AWARD AND CONSTRUCTION START

TRADE CLASSIFICATION CODES

- (J) Journeylevel Workers
- (H) Helper
- (TOT) Total by Column
- (A) Apprentice
- (TRN) Trainee

For each trade currently engaged by your company for all work performed in New York City, enter the current workforce for Males and Females by trade classification on the charts below.

Trade:	MALES						FEMALES			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.
J										
H										
A										
TRN										
TOT		T								
Total (Col. #1-10):										
Total Minority, Male & Female (Col. #2,3,4,5,7,8,9, & 10):										
Total Female (Col. #6 - 10):										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

FORM C: CURRENT WORKFORCE TO BE PROVIDED UPON CONTRACT AWARD AND CONSTRUCTION START

Trade: _____

Union Affiliation, if applicable

Total (Col. #1-10): _____

Total Minority, Male & Female
 (Col. #2,3,4,5,7,8,9, & 10): _____

Total Female
 (Col. #6 – 10): _____

	MALES					FEMALES				
	(1) White Non Hisp.	(2) Black Non Hisp.	(3) Hisp.	(4) Asian	(5) Native Amer.	(6) White Non Hisp.	(7) Black Non Hisp.	(8) Hisp.	(9) Asian	(10) Native Amer.
J										
H										
A										
TRN										
TOT										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?



E & A RESTORATION INC.

130 Crossways Park Drive, Suite 101
Woodbury, NY 11797
Tel: 516-921-7030 • Fax: 516-921-0259

Affirmative Action Policy Statement

This statement is to affirm E&A Restoration Inc.'s policy on providing Equal Employment Opportunity (EEO) to all employees and applicants for employment in accordance with all applicable Equal Employment Opportunity Affirmative Action laws, directives and regulations of Federal, State and Local governing bodies or agencies.

E&A Restoration Inc. will not discriminate against any employee or applicant for employment because of race, creed, religion, sexual orientation, color, national origin, ancestry, familial status, age, disability, marital status or other. E&A Restoration Inc. will maintain zero tolerance for harassment of or by any employee or applicant for employment because of race, creed, religion, sexual orientation, color, national origin, ancestry, familial status, age, disability, marital status or other.

E&A Restoration Inc. will take Affirmative Action (AA) to ensure that all employment practices are free of such discrimination and harassment. Such employment practices include, but are not limited to, the following: hiring, upgrading, demotion, transfer, recruitment or recruitment advertising, selection, layoff, disciplinary action, termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

E&A Restoration Inc. will use every good faith effort to provide business enterprises owned by minorities, women and individuals with disabilities with the maximum practicable opportunity to supply materials and/or participate in the performance of any contracts in which we engage.

SUMMARY PLAN DESCRIPTION

E & A RESTORATION, INC.

RETIREMENT PLAN

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INTRODUCTION

TYPE OF PLAN

Effective January 1, 2009, E & A Restoration, Inc. established a profit sharing plan. The plan is named the E & A Restoration, Inc. Retirement Plan, but it will be referred to in this summary as the *Plan*.

PLAN SPONSOR

E & A Restoration, Inc. is the sponsor of the Plan, and will sometimes be referred to in this summary as the *Sponsoring Employer*, the *Employer*, the *Company*, *we*, *us* or *our*. Our address is 40 Willis Ave., Syosset, NY 11791; our telephone number is (516) 921-7030; and our employer identification number is 11-3579414.

PURPOSE OF THIS SUMMARY

This booklet is called a Summary Plan Description (the *SPD*) and it is meant to describe highlights of the Plan in understandable language. It is not, however, meant to be a complete description of the Plan, nor is it meant to interpret, extend or change the provisions of the Plan in any way. If there is a conflict between this SPD and the Plan, the provisions of the Plan control your right to benefits. A copy of the Plan and related documents are on file with the Administrator and you can read them at any reasonable time. Also, no provision of the Plan or this SPD is intended to give you the right to continued employment or to prohibit changes in the terms or conditions of your employment. If you have any questions that are not addressed in this summary, you can contact the Administrator (who is described in the next section) during normal business hours.

PLAN ADMINISTRATION

PLAN TRUSTEE

The Plan is administered under a written plan and trust agreement. The trustee is responsible for trusteeing the Plan's assets. The trustee is Jenny Sakalis. The trustee can be contacted at 40 Willis Ave., Syosset, NY 11791.

PLAN ADMINISTRATOR

All matters other than investments that concern the operation of the Plan are the responsibility of the Administrator. The Administrator is E & A Restoration, Inc., whose address is 40 Willis Ave., Syosset, NY 11791, and whose telephone number is (516) 921-7030. The Administrator has the power and authority to interpret the terms of the Plan based on the Plan document and existing laws and regulations, as well as the power to determine all questions that arise under the Plan. Such power and authority include, for example, the administrative discretion necessary to resolve issues with respect to an employee's eligibility for benefits, credited service, Disability, and retirement, or to interpret any other term contained in the Plan and related documents. The Plan Administrator's interpretations and determinations are binding on all Participants, employees, former employees, and their beneficiaries.

PLAN NUMBER

For identification purposes, we have assigned number 001 to the Plan.

SERVICE OF LEGAL PROCESS

If you have to bring legal action against the Plan for any reason, legal process can be served on the Trustee at 40 Willis Ave., Syosset, NY 11791. Legal process can also be served on the trustee or on the Administrator.

GENERAL PLAN DEFINITIONS

Many definitions are used in this summary and most are defined in the section where they appear, but the following terms have broader application and are used throughout this summary:

ACCOUNT

Your Account represents the aggregate value of the various contributions made to the Plan on your behalf, as well as the net earnings on those contributions.

ALLOCATION PERIOD

The Allocation Period is the period of time for which a contribution to the Plan is allocated. The Allocation Period is generally the Plan Year, but to the extent contributions are made more frequently than annually, they will be allocated based on the Compensation earned during the Allocation Period. Except as otherwise noted, a contribution for an Allocation Period of less than 12 months will not be adjusted at the end of the Plan Year to reflect annual Compensation.

BREAK IN SERVICE

You will incur a Break in Service if you fail to perform, in any 12-month computation period, more than 500 Hours of Service for eligibility purposes and more than 500 Hours of Service for Vesting purposes. A Break in Service may affect your eligibility to receive an allocation of contributions and the number of your Years of Service which are counted in determining your Vested Interest in your Account.

DISABILITY

Disability is a physical or mental impairment you suffer after you become a Participant in the Plan (and while you are still an employee) which, in the opinion of the Social Security Administration, qualifies you for disability benefits under the Social Security Act in effect on the date that you suffer the mental or physical impairment. However, you will not be considered to have suffered a Disability if the physical or mental impairment is the result of (a) the excessive use of drugs, intoxicants, or other substances; (b) an intentionally self-inflicted injury or sickness; or (c) an injury suffered as a result of an unlawful or criminal act committed by you.

HOURLY OF SERVICE

An Hour of Service is any hour for which you have a right to be paid by us, including hours you are paid for vacation, holidays, illness, back pay and maternity leave.

NORMAL RETIREMENT AGE

Normal Retirement Age is the later of the date you reach age 65 or the date you are credited with at least 5 Years of Service (but in no event will your Normal Retirement Age be later than the later of the date you reach age 65 or the fifth anniversary of the date you become a Participant).

PLAN YEAR

The Plan Year is the 12 consecutive month accounting year of the Plan, and it begins each January 1st and ends the following December 31st.

VESTED INTEREST

Your Vested Interest is the percentage of your Account to which you are entitled at any point in time. However, notwithstanding any vesting schedule set forth in those other sections of the SPD, you will have a 100% Vested Interest in your Account upon reaching Normal Retirement Age or upon your death while you are still a Participant in the Plan.

YEAR OF SERVICE

A Year of Service is a period of time used to determine your eligibility to participate in the Plan and to determine your Vested Interest. A Year of Service for eligibility purposes is a 12 consecutive month computation period in which you are credited with at least 1,000 Hours of Service. Your initial eligibility computation period begins on your employment commencement date. Your second eligibility computation period overlaps your first eligibility computation period

and begins on the first day of the Plan Year which begins prior to the first anniversary of your employment commencement date. For example, if your employment commencement date is March 1st, your first eligibility computation period will end on the last day of the following February, but your second eligibility computation period will have already begun on the immediately preceding January 1st and will end the following December 31st. Each succeeding eligibility computation period (if required) will begin January 1st and end December 31st. A Year of Service for Vesting purposes is a 12 consecutive month computation period in which you are credited with at least 1,000 Hours of Service. The Vesting computation period is the Plan Year.

EMPLOYER CONTRIBUTIONS

HOW THE CONTRIBUTION IS DETERMINED

We may make Employer Contributions to the Plan from time to time. Making these contributions is totally discretionary on our part, as is the amount should we decide to make them.

HOW YOU BECOME A PARTICIPANT

To become a Participant in the Plan, you must satisfy the following criteria (described in more detail below): (a) you must be an Eligible Employee; (b) you must satisfy the age requirement and the service requirement; and (c) you must be employed by us on the applicable entry date.

- **ELIGIBLE EMPLOYEES.** All employees are considered to be Eligible Employees except for the following ineligible classes of Employees: (a) employees whose employment is governed by a collective bargaining agreement in which retirement benefits were the subject of good faith bargaining; and (b) employees who are non-resident aliens who do not receive earned income from us which constitutes income from sources within the United States.
- **AGE REQUIREMENT.** You must be at least 21 years of age.
- **SERVICE REQUIREMENT.** You must be credited with at least 1 Year of Service.
- **ENTRY DATE.** You will enter the Plan as a Participant on the January 1st or July 1st that coincides with or next follows the date that you first satisfy both the age and the service requirements described above.

HOW YOU QUALIFY FOR A CONTRIBUTION ALLOCATION

Once you become a Participant, you are eligible for a contribution allocation for any Allocation Period for which we make a contribution provided you satisfy the requirements described below:

- **ACTIVE PARTICIPANTS.** If you are still employed by us on the last day of an Allocation Period (and you are still an Eligible Employee on the last day of the Allocation Period), you will be eligible to receive an allocation if you are credited with at least 1,000 Hours of Service during the Allocation Period.
- **TERMINATED PARTICIPANTS.** If you terminate employment with us before the last day of an Allocation Period, you will only be eligible to receive an allocation for that Allocation Period if you are still an Eligible Employee on the day you terminate and in accordance with the following requirements: (a) if you terminate because of your retirement on or after Normal Retirement Age, you will be eligible to receive an allocation regardless of your service during the Allocation Period; (b) if you terminate because of your death, you will be eligible to receive an allocation regardless of your service during the Allocation Period; (c) if you terminate because of your disability, you will not be eligible to receive an allocation; and (d) if you terminate for any other reason, you will not be eligible to receive an allocation.

HOW THE CONTRIBUTION IS ALLOCATED

Employer Contributions are allocated using the grouping method. Under this method, you will be assigned to a group which will share in the contribution (if any) that we make for that group.

HOW YOUR COMPENSATION IS DETERMINED

In general, the amount of Employer Contributions made on your behalf is based on the amount reported on your Form W-2 (your "Compensation") for the calendar year that ends with or within the Plan Year. However, Employer Contributions will not be made with respect to Compensation in excess of the annual dollar limit on Compensation, which is \$245,000 for the Plan Years beginning in 2009 and 2010, and which will thereafter be the amount set annually by law. Employer Contributions will also not be made with respect to the following Compensation: amounts received prior to the date you become a Participant in the Plan.

HOW YOUR VESTED INTEREST IS DETERMINED

Your Vested Interest in your Account is determined by the vesting schedule following this paragraph, based on your credited Years of Service when your Vested Interest is determined. In determining your Vested Interest in your Account, all of your Years of Service will be counted except those that are credited during any period for which we did not maintain this Plan or a predecessor plan. Any part of this account which is not vested will be forfeited when you receive a distribution of your Vested Interest (or after you incur 5 consecutive Breaks in Service, if earlier) and will thereafter be used to reduce our other contributions.

1 Year of Service.....	0% Vested
2 Years of Service	20% Vested
3 Years of Service	40% Vested
4 Years of Service	60% Vested
5 Years of Service	80% Vested
6 Years of Service	100% Vested

TOP HEAVY REQUIREMENTS

Under certain circumstances, you may be entitled to a minimum allocation for any Plan Year in which the Plan is considered "top heavy." The Plan is considered top heavy for any Plan Year in which more than 60% of Plan assets are allocated to the Accounts of Participants who are "key" employees (that is, employees who satisfy certain ownership requirements and employees who are officers and whose Compensation for the Plan Year exceeds certain IRS limits). However, the Plan automatically satisfies this requirement in any Plan Year for which we make a contribution on your behalf to another qualified retirement plan (if any) that we sponsor.

If the Plan is not exempt, then for each Plan Year in which the Plan is considered top heavy and in which you are employed by us on the last day of the Plan Year, you will receive a minimum allocation equal to the lesser of 3% of your Compensation or the highest percentage of Compensation allocated for that Plan Year to the Accounts of Participants who are key employees.

MAXIMUM ALLOCATION LIMITATIONS

The amount of contributions and forfeitures that can be allocated to your Account for any Plan Year is limited by law to the lesser of 100% of your Compensation or the annual dollar limit, which is \$49,000 for the Plan Year beginning in 2010, and which will thereafter be the amount set annually by law. However, this limitation does not apply to the amount of earnings that can be allocated to your Account, to the amount of any Rollover Contributions you can make to the Plan, or to any other funds transferred to this Plan on your behalf from another qualified plan.

ROLLOVER CONTRIBUTIONS

If you participated in another retirement plan, you may be permitted to roll over any distribution you receive from the other plan to this Plan if all legal requirements (and any requirements imposed by the Administrator) are satisfied. Do not withdraw funds from any other plan or

account until you have received written approval from the Administrator to roll those funds into this Plan. If you do decide to make a rollover contribution and it is accepted by the Administrator, it will be kept in a separate Rollover Account established on your behalf. You will at all times have a 100% Vested Interest in your Rollover Account, and you can make withdrawals from your Rollover Account when you terminate employment.

DISTRIBUTION OF BENEFITS

DISTRIBUTIONS FOR REASONS OTHER THAN DEATH

If you terminate employment with us for any reason and your Vested Interest (including your Rollover Account) is \$5,000 or less, it will be distributed in a lump sum as soon as administratively feasible after you terminate employment. The distribution will be made to you or, at your election, will be rolled over either to another qualified retirement plan that agrees to receive the distribution or to an individual retirement account (IRA) established by you. However, if your Vested Interest (including your Rollover Account) is more than \$1,000 but not more than \$5,000 and you fail to elect either a lump sum or a rollover as described above, we will establish an individual retirement account (IRA) for you at a qualified financial institution of our choosing and will automatically roll your Vested Interest over to that IRA. Your funds will then be invested in a type of investment designed to preserve principal and provide a reasonable rate of return and liquidity, such as an interest-bearing account, a certificate of deposit, or a money market fund. The IRA provider will charge your IRA for any expenses associated with the establishment and maintenance of the IRA and with the IRA investments. If your Vested Interest is rolled over to an IRA under this "automatic rollover" requirement, you will be given more information at that time regarding the IRA provider and any fees or expenses associated with the IRA.

If your Vested Interest (including your Rollover Account) is more than \$5,000 and you terminate employment because of retirement on or after Normal Retirement Age or because you suffer a Disability, your Vested Interest will be distributed within an administratively feasible time after you terminate. If you terminate employment for reasons other than your retirement or Disability, your Vested Interest will be distributed within an administratively feasible time after the last day of the Plan Year in which you terminate employment. Your Vested Interest will be distributed in a lump sum which can be paid to you or, at your election, can be rolled over either to another qualified retirement plan that agrees to receive the distribution or to an individual retirement account. You can also elect not to receive a lump sum and instead elect monthly annuity payments from an insurance company.

In addition to the benefit payments described above, there are rules which require that certain minimum distributions be made from the Plan. Generally, these minimum distributions must begin no later than (a) the April 1st following the end of the year in which you reach age 70½ or (b) the April 1st following the end of the year in which you retire. However, if you are a 5% owner, you must begin receiving minimum distributions by the April 1st following the end of the year in which you reach age 70½ even if you are still employed by the Employer.

DISTRIBUTIONS UPON DEATH

Your Vested Interest will be distributed to your beneficiary as soon as administratively feasible after your death. If you are not married, you can name anyone to be your beneficiary. If you are married, your spouse by law is your beneficiary unless he or she waives the death benefit in writing. Your Vested Interest will be distributed to your beneficiary in a lump sum.

If your death occurs *before* the date that minimum distributions must begin (as described in the preceding section), the distribution of your Vested Interest to your beneficiary must be made within certain legal timeframes which are dependent upon several factors, including (a) whether you have a designated beneficiary, (b) your relationship to the beneficiary (spousal or non-spousal beneficiary) and (c) certain elections that your beneficiary may make after your death. However, if your death occurs *after* the date that minimum distributions must begin, the minimum death benefit that must be paid to your beneficiary each year after your death is based on the longer of your remaining life expectancy (had you survived) or the remaining life expectancy of your

beneficiary. Your beneficiary may also choose to accelerate the payment rate. Please contact the Administrator for more information regarding payments to beneficiaries.

Any death benefit received by your spouse can be rolled over to an IRA. Effective as of January 1, 2009, a non-spouse beneficiary may establish a special IRA (an "Inherited IRA") that can receive a direct rollover of all (except for any required minimum distributions) or a portion of a death benefit that would be distributed from the Plan to that non-spouse beneficiary.

Certain portions of a death benefit may not be eligible to be rolled over from the Plan into an Inherited IRA. If you (a deceased Participant) needed to take a required minimum distribution in the year of your death (but you have not yet taken that required minimum distribution), then that required minimum distribution cannot be rolled over from the Plan into an Inherited IRA. Similarly, if the non-spouse beneficiary needs to take any required minimum distribution from the Plan for the year in which the direct rollover occurs (or any prior year), then the non-spouse beneficiary cannot roll over that required minimum distribution into an Inherited IRA.

If the non-spouse beneficiary elects to roll over the death benefit to an Inherited IRA, then the inherited IRA will be subject to complicated required minimum distribution rules. You should inform your non-spouse beneficiary that (a) he or she is designated to receive your death benefit, and (b) your death benefit can be rolled over to an Inherited IRA. The non-spouse beneficiary should discuss any planning issues and tax consequences with their professional tax advisor with respect to a direct rollover of your death benefit into an Inherited IRA.

INVESTMENT OF ACCOUNTS

Your Account will be placed in the fund maintained by us, which we will invest in a diversified portfolio which may include savings and/or money market accounts, stocks, bonds, mutual funds, and insurance company funds. Your Account will share in the investment performance of the fund, which is valued at least annually. Investment results will reflect any fees and investment expenses that may be charged against yours and other Participants' Accounts. You may request more information on any fees and expenses associated with the Plan from the Administrator.

TAX WITHHOLDING ON DISTRIBUTIONS

Due to the complexity and frequency of changes in the federal laws that govern benefit distributions, penalties and taxes, the following is only a brief explanation of the law and IRS rules and regulations as of the date this summary is issued. You will receive additional information from the Administrator at the time of any benefit distribution, and you should consult your tax advisor to determine your personal tax situation before taking the distribution.

DIRECT ROLLOVERS NOT SUBJECT TO TAX

Any eligible distribution that is directly rolled over to another eligible retirement account (either another qualified retirement plan or an individual retirement account) is not subject to income tax withholding. Generally, any part of a distribution from this Plan can be directly rolled over to another eligible retirement account unless the distribution (1) is part of a series of equal periodic payments made over your lifetime, or over the lifetime of you and your beneficiary, or over a period of 10 years or more; or (2) is a minimum benefit payment which must be paid to you by law. There are other distributions that are not eligible for direct rollover treatment, and you should contact the Administrator if you have questions about a particular distribution.

20% WITHHOLDING ON TAXABLE DISTRIBUTIONS

If you have your benefit paid to you and it's eligible to be rolled over, you only receive 80% of the benefit payment. The Administrator is required to withhold 20% of the benefit payment and remit it to the Internal Revenue Service as income tax withholding to be credited against your taxes. If you receive the distribution before you reach age 59½, you may also have to pay an additional 10% tax. You can still rollover all or a part of the 80% distribution that is paid to you by putting it into an IRA or into another qualified retirement plan within 60 days of receiving it. If you want to

rollover 100% of the eligible distribution to an IRA or to another qualified retirement plan, you must find other money to replace the 20% that was withheld. You cannot elect out of the 20% withholding (1) unless you are permitted (and elect) to leave your benefit in this Plan, or (2) unless you have 100% of an eligible distribution transferred directly to an IRA or to another qualified retirement plan that accepts rollover contributions.

CLAIMS PROCEDURE

If you feel that you are entitled to a benefit that you are not receiving from the Plan, you can make a written request to the Plan Administrator (or its delegate) for the benefit. If your request is denied, you will be informed by written or electronic notice within 90 days after the Administrator receives your request. This notice will contain the following information: (a) the specific reason or reasons for denial; (b) specific reference to the Plan provisions on which the denial is based; (c) a description of any additional material or information necessary in order to present a thorough appeal and an explanation of why such material or information is needed; and (d) an explanation of the claim appeal procedure and time limits applicable to the procedure, including a statement of your right to bring a civil action under ERISA Section 502 after a denial on appeal.

Note: If the Administrator needs more than 90 days to review your claim for benefits, you will be advised by written or electronic notice within 90 days after the Administrator receives your claim. The notice will tell you why the Administrator needs more time (which cannot exceed an additional 90 days), and the date by which you can expect a decision.

If you disagree with the Administrator's decision to deny your claim, you can appeal the denial to the Administrator. You must submit this appeal to the Administrator within 60 days after the date that you receive the notice of denial of your initial claim. For purposes of the review, you have the right to (a) submit written comments, documents, records and other information relating to the claim for benefits; (b) request, free of charge, reasonable access to, and copies of all documents, records and other information relevant to your claim for benefits; and (c) a review that takes into account all comments, documents, records, and other information you submitted relating to the claim, regardless of whether the information was submitted or considered in the initial decision.

Your denied claim will be reviewed by the Administrator and within 60 days after receipt of the request for review you will receive a written or electronic notice of the Administrator's decision. The notice will (a) provide the specific reason or reasons for denial; (b) refer to the provisions of the Plan on which the denial is based; (c) contain a statement that you are entitled to receive, upon request and free of charge, reasonable access to, and copies of, all documents, records, and other information relevant to your claim; and (d) describe any voluntary appeal procedures offered by the Plan and your right to obtain information about the procedures, and a statement of your right to bring a civil action if you disagree with the Plan Administrator's decision on appeal.

Note: If the Administrator needs more than 60 days to review your denied claim, you will be advised in writing (or electronically) within 60 days after the Administrator receives the request for review. The notice will tell you why the Administrator needs more time (up to an additional 60 days), and the date by which you can expect a decision.

OTHER INFORMATION

ATTACHMENT OF YOUR ACCOUNT

Your creditors cannot garnish or levy upon your Account except in the case of a proper Internal Revenue Service tax levy, and you cannot assign or pledge your Account except as directed through a Qualified Domestic Relations Order as part of a divorce, child support or similar proceeding in which a court orders that all or part of your Account be transferred to another person (such as your ex-spouse or your children). The Plan has a procedure for processing QDROs, which you can obtain free of charge from the Administrator.

AMENDMENT OR TERMINATION OF THE PLAN

Although we intend for the Plan to be permanent, we can amend or terminate it at any time. If we do terminate the Plan, all Participants will have a 100% Vested Interest in their Accounts as of the Plan termination date, and all Accounts will be available for distribution at the same time and in the same manner as would have been permissible had the Plan not been terminated.

ACCOUNTS ARE NOT INSURED

Your Account is not insured by the Pension Benefit Guaranty Corporation (PBGC) because the insurance provisions of the ERISA do not apply to profit sharing plans. For more information on PBGC coverage, ask the Administrator or contact the PBGC. Written inquiries to the PBGC should be addressed to: Technical Assistance Division, PBGC, 1200 K Street NW, Suite 930, Washington, D.C. 20005-4026. You can also call the PBGC with any questions at (202) 326-4000.

PAYMENT OF PLAN EXPENSES

The Plan routinely incurs expenses for the services of lawyers, actuaries, accountants, third party administrators, and other advisors. Some of these expenses may be paid directly by us while other expenses may be paid from the assets of the Plan. The expenses that are paid from Plan assets will be shared by all Participants either on a pro-rata basis or an equal dollar basis. If the expense is paid on a pro-rata basis, an amount will be deducted from your Account based on its value as compared to the total value of all Participants' Accounts. For example, if the Plan pays \$1,000 of expenses and your Account constitutes 5% of the total value of all Accounts, \$50 would be deducted from your Account ($\$1,000 \times 5\%$) for its share of the expense. On the other hand, if the expense is paid on an equal dollar basis, the expense is divided by the number of Participants and then the same dollar amount is deducted from each Participant's Account.

QUALIFIED RESERVIST DISTRIBUTIONS

Special rules apply to any Qualified Reservist Distribution taken after September 11, 2001. A Qualified Reservist Distribution may be made to a Qualified Reservist under any circumstance and/or for any reason. A Qualified Reservist Distribution is any distribution of Elective Deferrals to a Qualified Reservist that is made during the period beginning on the date that the Qualified Reservist is ordered or called to duty and ending on the last day of active duty. A Qualified Reservist is an individual who is a member of a reserve component and who is called to active duty after September 11, 2001 either for a period in excess of 179 days or for an indefinite period.

Qualified Reservist Distributions are not subject to the 10% early withdrawal penalty tax. In addition, at any time during the two-year period beginning on the day after the last day of the Qualified Reservist's active duty (but the two-year period will not end earlier than August 17, 2008), a Qualified Reservist who has received one or more Qualified Reservist Distributions may make one or more repayment contributions to an IRA; the aggregate amount of the repayment contributions cannot exceed the total amount of the Qualified Reservists Distributions. The dollar or compensation limitations that apply to contributions to an IRA do not apply to any repayment contribution of Qualified Reservist Distributions. However, you will not receive any tax deduction for repayment of Qualified Reservist Distributions to an IRA.

STATEMENT OF ERISA RIGHTS

YOUR RIGHT TO RECEIVE INFORMATION

As a Participant, you are entitled to certain rights and protections under the Employee Retirement Income Security Act of 1974 (ERISA). ERISA provides that all Plan Participants are entitled to (a) examine, without charge, at the Plan Administrator's office and at other specified locations, such as worksites and union halls, all documents governing the Plan, including insurance contracts and collective bargaining agreements, and a copy of the latest annual report (Form 5500 Series) filed by the Plan with the U.S. Department of Labor and available at the Public Disclosure Room of the Pension and Welfare Benefit Administration; (b) obtain copies of documents governing the operation of the Plan, including insurance contracts and collective bargaining agreements, and copies of the latest annual report (Form 5500 Series) and updated summary plan description upon written request to the Plan Administrator. The Administrator may make a reasonable charge for

the copies; (c) receive a summary of the Plan's annual financial report. The Plan Administrator is required by law to furnish each Participant with a copy of this summary annual report; and (d) obtain a statement telling you whether you have a right to receive a pension at Normal Retirement Age (which is defined elsewhere in this summary plan description) and if so, what your benefits would be at Normal Retirement Age if you stop working under the Plan now. If you do not have a right to a pension, the statement will tell you how many more years you have to work to get a right to a pension. This statement must be requested in writing and is not required to be given more than once every twelve (12) months. The Plan must provide the statement free of charge.

DUTIES OF PLAN FIDUCIARIES

In addition to creating rights for Plan Participants, ERISA imposes duties upon the people who are responsible for the operation of the Plan. The people who operate your Plan, called "fiduciaries" of the Plan, have a duty to do so prudently and in the interest of you and other Plan Participants and beneficiaries. No one, including your Employer, your union, or any other person, may fire you or otherwise discriminate against you in any way to prevent you from obtaining a pension benefit or exercising your rights under ERISA.

ENFORCEMENT OF RIGHTS

If your claim for a pension benefit is denied or ignored, in whole or in part, you have a right to know why this was done, to obtain copies of documents relating to the decision without charge, and to appeal any denial, all within certain time schedules. Under ERISA, there are steps you can take to enforce the above rights. For instance, if you request a copy of Plan documents or the latest annual report from the Plan and do not receive them within 30 days, you may file suit in a Federal court. In such a case, the court may require the Plan Administrator to provide the materials and pay you up to \$110 a day until you receive the materials, unless the materials were not sent because of reasons beyond the control of the Administrator. If you have a claim for benefits which is denied or ignored, in whole or in part, you may file suit in a state or Federal court. In addition, if you disagree with the Plan's decision or lack thereof concerning the qualified status of a domestic relations order, you may file suit in Federal court. If it should happen that Plan fiduciaries misuse the Plan's money, or if you are discriminated against for asserting your rights, you may seek assistance from the U.S. Department of Labor, or you may file suit in a Federal court. The court will decide who should pay court costs and legal fees. If you are successful, the court may order the person you have sued to pay these costs and fees. If you lose, the court may order you to pay these costs and fees, for example, if it finds your claim is frivolous.

ASSISTANCE WITH YOUR QUESTIONS

If you have any questions about your Plan, you should contact the Plan Administrator. If you have any questions about this statement or about your rights under ERISA, or if you need assistance in obtaining documents from the Plan Administrator, you should contact the nearest office of the Employee Benefits Security Administration, U.S. Department of Labor, listed in your telephone directory (or which can also be found at the Employee Benefits Security Administration website at http://www.dol.gov/ebsa/aboutebsa/org_chart.html) or the Division of Technical Assistance and Inquiries, Employee Benefits Security Administration, U.S. Department of Labor, 200 Constitution Avenue N.W., Washington, D.C. 20210.

You can call the Employee Benefits Security Administration at (866) 444-3272; TTY/TDD users: (877) 889-5627. You may also obtain certain publications about your rights and responsibilities under ERISA by calling the publications hotline of the Employee Benefits Security Administration. You may obtain additional pension-related information at the Department of Labor's website at <http://www.dol.gov/ebsa/publications/wyskapr.html> where you can review a publication called "*What You Should Know About Your Retirement Plan.*"

**E & A RESTORATION, INC.
RETIREMENT PLAN
BENEFICIARY DESIGNATION FORM**

NAME _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 DATE OF BIRTH _____ DATE OF HIRE _____ SOCIAL SECURITY # _____

SECTION 1. DESIGNATION OF BENEFICIARY

PRIMARY BENEFICIARIES. I designate the following as my primary beneficiary or beneficiaries:

NAME	SOCIAL SECURITY #	ADDRESS	RELATIONSHIP	% SHARE

CONTINGENT BENEFICIARIES. If my primary beneficiary predeceases me, I designate the following as my contingent beneficiary or beneficiaries:

NAME	SOCIAL SECURITY #	ADDRESS	RELATIONSHIP	% SHARE

TRUST INFORMATION. If a trust is named as a beneficiary (primary or contingent), the trustees of the trust are _____
 _____ and the creation date of the trust is _____.

FILING STATUS

- I am legally single (*Do not complete Section 2*)
- I am legally married and my spouse is the primary beneficiary of 100% of my account. (*Do not complete Section 2*)
- I am legally married and my spouse is not a primary beneficiary of 100% of my account. (*You must complete Section 2*)

EMPLOYEE SIGNATURE _____ DATE _____

SECTION 2. SPOUSAL CONSENT

I am the spouse of the employee who completed and signed page 1 of this form, and I understand the spousal death benefit to which I am entitled under the terms of the plan. I realize that my spouse is waiving this spousal death benefit and I voluntarily consent to the waiver. I hereby consent to my spouse's designation of beneficiary and agree to release and discharge the Trustee, the Plan Administrator, and the Company from liability for acting pursuant to this irrevocable consent.

SIGNATURE OF SPOUSE _____ DATE _____

PRINT NAME _____

SIGNATURE OF WITNESS _____ DATE _____

PRINT NAME _____

- The Witness is a Plan Representative
 The Witness is a Notary Public (*complete the following*)

STATE OF _____

COUNTY OF _____

On the _____ day of _____, 200____, before me, the undersigned, a Notary Public in and for said State, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

NOTARY PUBLIC _____

MY COMMISSION EXPIRES _____

Vision Insurance - Silver Plan Summary

Offering Vision benefits does a lot more than provide employees with access to discounted eye wear. Regular eye exams can provide early detection of eye diseases, as well as health conditions like diabetes and high blood pressure. Our plans provide the freedom to choose any Vision care provider, but members may save more at a participating network provider. Plus, **examinations, and single or bifocal lenses are covered at 100%** when using a participating provider.

Benefit Amounts		<i>This is a partial listing only. Please refer to the policy for details.</i>	
		In-network benefits	Out-of-network reimbursements
Examination	Once every 12 months¹	Covered 100%	Up to \$50
Lenses	Once every 12 months¹		
	Single vision	Covered 100%	Up to \$35
	Bifocal vision	Covered 100%	Up to \$85
	Intermediate vision	Covered 100% after \$30 copay	Up to \$85
	Trifocal	Covered 100%	Up to \$165
	Lenticular	Covered 100%	Up to \$165
Lens Options	Once every 12 months¹		
	Scratch resistant coating	Covered 100%	
	Fashion/gradient tint	Covered 100%	
	Solid tint	Covered 100%	
	Glass photogrey single vision lens	Discounted to \$20²	
	Glass photogrey bifocal and trifocal lens	Discounted to \$30²	
	Ultraviolet (UV) coating	Discounted to \$12²	N/A
	Standard anti-reflective (AR) coating	Covered 100% after \$35 copay	
	Polarized lenses	Discounted to \$75²	
	Polycarbonate lenses	Covered 100%³	
	Standard progressive lenses	Discounted to \$50²	
	Premium progressive lenses	Covered 100% after \$90 copay	
Frames	Once every 12 months¹		
	Frame allowance	\$130 retail allowance⁶ (20% overage discount)	Up to \$35
Contacts	Once every 12 months¹		
<i>(In lieu of eyeglasses)</i>	Maximum allowance for conventional lenses	\$130 retail allowance⁴ (15% overage discount)	
	Maximum allowance for disposable lenses	\$130 retail allowance⁴ (10% overage discount)	Up to \$200⁷
	Medically necessary contact lenses ⁵	Covered 100%	
	Evaluation, fitting, and follow-up care - standard lens	\$20 (daily wear lenses)⁷	
		\$30 (ext. wear lenses)⁷	N/A
	Evaluation, fitting, and follow-up care - specialty lens	Covered 100% after \$50 copay⁷	

¹Benefit year is based on an enrollee's last date of service.

²Actual discounted amounts may vary.

³Prior authorization required. Polycarbonate lenses are covered in full for: Dependent children to age 26, monocular patient, and patients with prescription +/- 6.00 diopters or greater. All others (Polycarbonate SV discounted to \$25 & Polycarbonate Bi/Trif discounted to \$30).

⁴Does not apply at Contact Fill or Cole corporate locations (if applicable) and where prohibited by law. Prohibited by some manufacturers.

⁵Prior authorization required.

⁶Does not apply for certain proprietary frame brands and where prohibited by law.

⁷Only covered if member chooses contact lenses.

Getting the most out of your Vision Plan

Members have the freedom to visit the Vision Care provider of their choice but out-of-pocket expenses may be reduced significantly when choosing a network provider. Our network has more than **40,000+ eye care professionals** including retailers and independent doctors nationwide. **Locate participating providers at: www.e-nva.com.**

Additionally, after the member has exhausted their funded benefit, they're eligible to access significant discounts on materials through participating network providers through the **EYEESSENTIAL Plan**.

Register your account online

Once enrolled, members can register their account online at **www.e-nva.com** and use a full menu of helpful tools:

- **View eligibility information** and print copies of **ID cards**
- **Search participating eyecare professionals** in the area, or nominate a preferred eyecare professional (if not participating)
- **Submit, view, and check the status of claims**
- Find answers to our most **frequently asked questions**
- **Use the Member's Guide to Purchasing Eyewear -**

Vision Benefit Maximizer

Find an eyecare professional's service level and frame inventory (the number of frames they have available at no additional out-of-pocket cost when using the vision plan)

Smart Buyer's Guide to Frames

Makes it easy to pick out frames according to face shape, skin tone, eye/hair color, etc.

Smart Buyer's Guide to Lenses

Find out which eyeglass lens types, materials, lens coatings, etc. are best for you

Vision Claims Guide

How often can I use my benefits?

Since the benefit year is based on your last date of service, you can use your benefits once every 12 months from the last date of service.

- Preventive eye health examination benefits are available once every 12 months.
- Lenses/frames or contact lenses are covered once every 12 months.

How do I find a participating provider?

Our policy with network option offers you the freedom to visit the Vision Care provider of your choice, but your out-of-pocket expenses may be reduced significantly when choosing an NVA (National Vision Administrators, L.L.C.) network provider.

If you choose to take advantage of the network savings, you can locate NVA Vision network providers on their website: www.e-nva.com

How do ShelterPoint and NVA work together?

ShelterPoint is your carrier, providing you with an insured Vision Care plan. NVA is a network enhancement to your underlying vision coverage from ShelterPoint: Participating providers accept a fixed, lower negotiated fee when receiving payment for their services. Your Benefit Plan Administrator can explain your specific benefit levels and fees.

Using the network is easy

No ID cards needed! In-network providers can **easily verify member information and eligibility for services without an ID card**, however for easy identification and reference, members may print them from their member portal.

No claim forms are needed for services from a participating network provider! Simply provide the office with the member ID number and/or name and date of birth of any covered member needing services.

How out-of-network services work

Members have the freedom to choose any Vision Care provider. When choosing an **out-of-network** provider, the member pays the fees for services and materials first to the provider **at point of service and is then reimbursed** according to their plan's schedule.

Out-of-network claims:

For services from an out-of-network provider, members need to submit a claim for reimbursement either online or by mail.

Vision Claim Administrator:

NVA

Attn: ShelterPoint

P.O. Box 2187

Clifton, NJ 07015

Claim forms are available for download at either:

www.shelterpoint.com or **www.e-nva.com**

How can I check the status of my claim?

- Visit the member portal at: **www.e-nva.com**
- Call the dedicated toll-free member services telephone number: **877-241-7124**

Exclusions & Limitations

No benefits are payable except as stated in the policy and certificate. This insurance does not apply to any expense for:

1. Services performed by a member of the covered person's immediate family;
2. Benefits provided under Medicare or other governmental program (except Medicaid), employers' liability or occupational disease law;
3. Benefits provided under any state or Federal workers' compensation law;
4. Services for which there is normally no charge;
5. Illness, accident, treatment, or medical conditions arising from intentionally self-inflicted injury; or
6. Illness, accident, treatment, or medical conditions arising from war or act of war, declared or not, or participation in a felony, riot or insurrection.

The information in this material is for illustrative purposes only, providing a general overview of featured benefit highlights provided under the policy. It is not a contract. In the event of conflicting information with the policy/certificate, the policy/certificate will take precedence over what is shown in this material. The policy described in this material covers Vision benefits only. All coverage extends up to policy limits. Policies are reviewed annually and may be cancelled for nonpayment. Please refer to the policy for coverage details, a complete listing of covered services, policy provisions, conditions, exclusions, and terms under which the policy may be continued or cancelled. Not available in all jurisdictions.

Policy available in and underwritten by:

ShelterPoint Life Insurance Company (principal office in Garden City, NY) in: **MI** (SPL GV0215 P MI), **NY** (SPL GV 115 P NY).

ShelterPoint Insurance Company (licensed in 48 jurisdictions, not including NY) in: **AL** (SPI GV0215 P AL), **AK** (SPI GV0215 P AK), **AZ** (SPI GV0215 P AZ), **AR** (SPI GV0215 P AR), **CO** (SPI GV0215 P CO), **CT** (SPI GV0215 P CT), **DC** (SPI GV0215 P DC), **DE** (SPI GV0215 P DE), **FL** (SPI GV0215 P FL), **GA** (SPI GV0215 P GA), **IA** (SPI GV0215 P IA), **ID** (SPI GV0215 P ID), **IL** (SPI GV0215 P IL), **IN** (SPI GV0215 P IN), **KS** (SPI GV0215 P KS), **KY** (SPI GV0215 P KY), **LA** (SPI GV0215 P LA), **MS** (SPI GV0215 P MS), **MO** (SPI GV0215 P MO), **ND** (SPI GV0215 P ND), **NE** (SPI GV0215 P NE), **NH** (SPI GV0215 P NH), **NJ** (SPI GV0215 P NJ), **NV** (SPI GV0215 P NV), **OH** (SPI GV0215 P OH), **OK** (SPI GV0215 P OK), **OR** (SPI GV0215 P OR), **PA** (SPI GV0215 P PA), **RI** (SPI GV0215 P RI), **SC** (SPI GV0215 P SC), **SD** (SPI GV0215 P SD), **TN** (SPI GV0215 P TN), **TX** (SPI GV0215 P TX), **UT** (SPI GV0215 P UT), **VT** (SPI GV0215 P VT), **WV** (SPI GV0215 P WV), **WI** (SPI GV0215 P WI), **WY** (SPI GV0215 P WY).

For the most updated list of available states, please visit our website (www.shelterpoint.com).

This brochure only applies to NY.



OXFORD HEALTH INSURANCE, INC.
NY S LBTY NG 40/70/3000/65 EPO 22 - Non-Gated
SUMMARY OF COVERAGE
0
Liberty Network

BENEFIT	IN-NETWORK
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FINANCIAL

Deductible:	Single	\$3,000
	Family	\$6,000
Coinsurance:		35%
Maximum Out-Of-Pocket:	Single	\$8,700
	(Including Deductible) Family	\$17,400
Financial Accumulation Period:		Calendar Year
Out-of-Network Reimbursement:		Not Applicable

Please Note: All Copayments, Deductibles, and Coinsurance (medical and prescription) paid for In-Network Covered Services contribute to the In-Network, Out-of-Pocket Maximum.

PREVENTIVE CARE

Adult Preventive Care	No Charge
Infant and Pediatric Preventive Care	No Charge
Preventive Dental for Children (Up to age 19)	No Charge after Deductible
Pediatric Vision Exam (Up to age 19)	\$30 copay per visit
Pediatric Vision Hardware (Up to age 19)	50% Coinsurance

OUTPATIENT CARE

Primary Care Physician Office Visits	\$40 copay per visit
Specialist Office Visits	\$70 copay per visit
Virtual Visits	No Charge
Outpatient Surgery - Hospital Setting	Deductible & 35% Coinsurance
Outpatient Surgery - Freestanding Facility	Deductible & 35% Coinsurance
Laboratory Services	\$25 copay per service
Radiology Services	Deductible & 35% Coinsurance

DIABETIC SUPPLIES AND MEDICATIONS

Diabetic Supplies	\$40 copay
Diabetic Medications	\$40 copay

MRIs, MRAs, CT SCANS, AND PET SCANS

Outpatient Hospital Services	Deductible & 35% Coinsurance
Freestanding Radiology Facility	Deductible & 35% Coinsurance

HOSPITAL CARE

Physician's and Surgeon's Services	Deductible & 35% Coinsurance
Semi-Private Room and Board	Deductible & 35% Coinsurance
All Drugs and Medication	Deductible & 35% Coinsurance

EMERGENCY CARE

Ambulance Service When Medically Necessary	No Charge
At Hospital Emergency Room (<i>waived if admitted</i>) (<i>If member is admitted to the hospital, notification is required.</i>)	Deductible & 50% Coinsurance
Emergency Care in Urgi-Center	\$75 copay per visit

MATERNITY CARE

Prenatal and Post-Natal Care	No Charge
Hospital Services for Mother and Child	Deductible & 35% Coinsurance

SKILLED NURSING FACILITY

Limited to 200 days per Policy Year.	Deductible & 35% Coinsurance
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HOSPICE CARE

Inpatient Care	Deductible & 35% Coinsurance
Home Hospice - Unlimited.	\$70 copay per visit

HOME HEALTH CARE

Limited to 40 visits per Policy Year.	\$70 copay per visit
Physician House Calls	\$70 copay per visit

SUBSTANCE USE DISORDER SERVICES

Inpatient Rehabilitation	Deductible & 35% Coinsurance
Outpatient Rehabilitation	\$70 copay per visit
Outpatient Partial Hospitalization	Deductible and then \$40 copay per visit

BENEFIT	IN-NETWORK
MENTAL HEALTH CARE	
Inpatient Care	Deductible & 35% Coinsurance
Outpatient Visits	\$70 copay per visit
Outpatient Partial Hospitalization	Deductible and then \$40 copay per visit
ALLERGY CARE	
Testing and Treatment	\$70 copay per visit
ALTERNATIVE MEDICINE	
Chiropractic Care - Unlimited	\$70 copay per visit
SHORT TERM REHABILITATION	
Inpatient - Limited to 60 combined days per Policy Year.	Deductible & 35% Coinsurance
Outpatient - Limited to 60 combined PT/OT/ST visits per condition per Policy Year.	\$70 copay per visit
HABILITATIVE SERVICES	
Inpatient - Limited to 60 combined days per Policy Year.	Deductible & 35% Coinsurance
Outpatient - Limited to 60 combined PT/OT/ST visits per condition per Policy Year.	\$70 copay per visit
DURABLE MEDICAL EQUIPMENT	
Durable Medical Equipment - Unlimited. <i>Recertification required for items over \$500</i>	Deductible & 35% Coinsurance
MEDICAL SUPPLIES	
Medical Supplies When Medically Necessary	Deductible & 35% Coinsurance
HEARING AIDS	
Hearing Aids - Coverage is limited to a single purchase (including repair/replacement) per hearing impaired ear every three years.	Deductible & 35% Coinsurance
EXERCISE FACILITY	
Subscriber	\$200 reimbursement per 6 month period
Spouse/Dependents over age 13	\$100 reimbursement per 6 month period
OUTPATIENT PRESCRIPTION DRUGS - DEDUCTIBLE	
	\$200 Deductible (Waived for Tier 1 drugs)
OUTPATIENT PRESCRIPTION DRUGS - RETAIL	
<i>The Prescription Drug Benefit is based on a Per Calendar Year limit for any applicable deductibles and/or maximum limits.</i>	
Tier 1	\$10 copay
Tier 2	\$50 copay
Tier 3	\$90 copay
OUTPATIENT PRESCRIPTION DRUGS - MAIL ORDER	
Tier 1	\$25 copay
Tier 2	\$125 copay
Tier 3	\$225 copay

DEPENDENT ELIGIBILITY:

Eligible dependents include the employee's spouse and dependent children until the child reaches age 26.
A Dependent who has attained the above limiting age can continue coverage until they reach age 30 subject to the eligibility requirements outlined in the Certificate.
Domestic Partners are covered with proper documentation.

Please Note: This sample summary of coverage is provided for informational purposes only. The applicable Summary of Benefits will be issued to eligible enrolled members as part of the Certificate of Coverage. Coverage is subject to the terms and conditions of the Certificate.

Refer to the Certificate of Coverage for a more complete listing of all benefits, limitations, and exclusions which include, among other services not authorized by Oxford, cosmetic surgery, routine foot care, custodial care, personal comfort or convenience items, private or special duty nursing, learning and behavioral disorders, Worker's Compensation, military service-related conditions, or, unless otherwise stated, dental services and vision correction services and supplies.

Benefits are subject to final approval by the Department of Insurance and therefore may be subject to change.



The Summary of Benefits and Coverage (SBC) document will help you choose a health plan. The SBC shows you how you and the plan would share the cost for covered health care services. **NOTE: Information about the cost of this plan (called the premium) will be provided separately. This is only a summary.** For more information about your coverage, or to get a copy of the complete terms of coverage, www.myuhc.com. For general definitions of common terms, such as allowed amount, balance billing, coinsurance, copayment, deductible, provider, or other underlined terms see the Glossary. You can view the Glossary at www.healthcare.gov/sbc-glossary/ or call 1-800-444-6222 to request a copy.

Important Questions	Answers	Why This Matters:
What is the overall deductible?	<u>Network</u> : \$3,000 Individual /\$6,000 Family Per calendar year.	Generally, you must pay all of the costs from <u>providers</u> up to the <u>deductible</u> amount before this <u>plan</u> begins to pay. If you have other family members on the <u>plan</u> , each family member must meet their own individual <u>deductible</u> until the total amount of <u>deductible</u> expenses paid by all family members meets the overall family <u>deductible</u> .
Are there services covered before you meet your deductible?	Yes. <u>Preventive care</u> and categories with a <u>copay</u> are covered before you meet your <u>deductible</u> .	This <u>plan</u> covers some items and services even if you haven't yet met the annual <u>deductible</u> amount. But a <u>copayment</u> or <u>coinsurance</u> may apply. For example, this <u>plan</u> covers certain <u>preventive services</u> without <u>cost-sharing</u> and before you meet your <u>deductible</u> . See a list of covered services at www.healthcare.gov/coverage/preventive-care-benefits/ .
Are there other deductibles for specific services?	Yes, <u>Prescription drugs</u> -- \$200 per person, does not apply to Tier 1 drugs. There are no other <u>deductibles</u> .	You must pay all of the costs for these services up to the specific <u>deductible</u> amount before this <u>plan</u> begins to pay for these services.
What is the out-of-pocket limit for this plan?	<u>Network</u> : \$8,700 Individual /\$17,400 Family	The <u>out-of-pocket limit</u> is the most you could pay in a year for covered services. If you have other family members in this <u>plan</u> , they have to meet their own <u>out-of-pocket limits</u> until the overall family <u>out-of-pocket limit</u> has been met.
What is not included in the out-of-pocket limit?	<u>Premiums</u> , <u>balance-billing</u> charges, and health care this <u>plan</u> doesn't cover.	Even though you pay these expenses, they don't count toward the <u>out-of-pocket limit</u> .
Will you pay less if you use a network provider?	Yes. See www.myuhc.com or call 1-800-444-6222 for a list of <u>network providers</u> .	This <u>plan</u> uses a <u>provider network</u> . You will pay less if you use a <u>provider</u> in the <u>plan's network</u> . You will pay the most if you use an <u>out-of-network provider</u> , and you might receive a bill from a <u>provider</u> for the difference between the <u>provider's charge</u> and what your <u>plan</u> pays (<u>balance billing</u>). Be aware, your <u>network provider</u> might use an <u>out-of-network provider</u> for some services (such as lab work). Check with your <u>provider</u> before you get services.
Do you need a referral to see a specialist?	No.	You can see the <u>specialist</u> you choose without a <u>referral</u> .

¹Oxford HMO products are underwritten by Oxford Health Plans (NY), Inc., Oxford Health Plans (NJ), Inc., and Oxford Health Plans (CT), Inc. Oxford insurance products are underwritten by Oxford Health Insurance, Inc.

 All copayment and coinsurance costs shown in this chart are after your deductible has been met, if a deductible applies.

Common Medical Event	Services You May Need	What You Will Pay		Limitations, Exceptions, & Other Important Information
		<u>Network Provider</u> (You will pay the least)	<u>Out-of-Network Provider</u> (You will pay the most)	
If you visit a health care <u>provider's</u> office or clinic	Primary care visit to treat an injury or illness	\$40 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	Virtual visits (Telehealth) - No Charge per visit by a Designated Virtual <u>Network Provider</u> , <u>deductible</u> does not apply. If you receive services in addition to office visit, additional <u>copays</u> , <u>deductibles</u> , or <u>coinsurance</u> may apply e.g. surgery.
	<u>Specialist</u> visit	\$70 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	If you receive services in addition to office visit, additional <u>copays</u> , <u>deductibles</u> , or <u>coinsurance</u> may apply e.g. surgery.
	<u>Preventive care/screening/immunization</u>	No Charge	Not Covered	You may have to pay for services that aren't <u>preventive</u> . Ask your <u>provider</u> if the services needed are <u>preventive</u> . Then check what your <u>plan</u> will pay for.
If you have a test	<u>Diagnostic test</u> (x-ray, blood work)	Lab: \$25 <u>copay</u> per service, <u>deductible</u> does not apply X-ray: 35% <u>coinsurance</u>	Not Covered	none
	Imaging (CT/PET scans, MRIs)	35% <u>coinsurance</u>	Not Covered	none
	Tier 1	Retail: \$10 <u>copay</u> , <u>deductible</u> does not apply Mail-Order: \$25 <u>copay</u> , <u>deductible</u> does not apply	Not Covered	<u>Provider</u> means pharmacy for purposes of this section. Retail: Up to a 30-day supply Mail Order: Up to a 90-day supply You may need to obtain certain drugs, including certain <u>specialty drugs</u> , from a pharmacy designated by us. Certain drugs may have a <u>preauthorization</u> requirement or may result in a higher cost. Certain <u>preventive</u> medications (including certain contraceptives) are covered at No Charge. See the website listed for information on drugs covered by your <u>plan</u> . Not all drugs are covered. You may be required to use a lower-cost drug(s) prior to benefits under your policy being available for certain <u>prescribed drugs</u> .
	Tier 2	Retail: \$50 <u>copay</u> Mail-Order: \$125 <u>copay</u>	Not Covered	
	Tier 3	Retail: \$90 <u>copay</u> Mail-Order: \$225 <u>copay</u>	Not Covered	

Common Medical Event	Services You May Need	What You Will Pay		Limitations, Exceptions, & Other Important Information
		<u>Network Provider</u> (You will pay the least)	<u>Out-of-Network Provider</u> (You will pay the most)	
<p>If you need drugs to treat your illness or condition More information about <u>prescription drug coverage</u> is available at www.myuhc.com</p>	Tier 4	Not Applicable	Not Applicable	Tier not applicable for this <u>plan</u> .
If you have outpatient surgery	Facility fee (e.g., ambulatory surgery center)	35% <u>coinsurance</u>	Not Covered	none
	Physician/surgeon fees	35% <u>coinsurance</u>	Not Covered	none
If you need immediate medical attention	<u>Emergency room care</u>	50% <u>coinsurance</u>	50% <u>coinsurance</u> *	* <u>Network Deductible</u> Applies.
	<u>Emergency medical transportation</u>	No Charge	No Charge	none
	<u>Urgent care</u>	\$75 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	If you receive services in addition to Urgent care visit, additional <u>copays</u> , <u>deductibles</u> , or <u>coinsurance</u> may apply e.g. surgery.
If you have a hospital stay	Facility fee (e.g., hospital room)	35% <u>coinsurance</u>	Not Covered	none
	Physician/surgeon fees	35% <u>coinsurance</u>	Not Covered	none
If you need mental health, behavioral health, or substance abuse services	Outpatient services	\$70 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	<u>Network</u> partial hospitalization/intensive outpatient treatment: 35% <u>coinsurance</u>
	Inpatient services	35% <u>coinsurance</u>	Not Covered	none
If you are pregnant	Office visits	No Charge	Not Covered	

Common Medical Event	Services You May Need	What You Will Pay		Limitations, Exceptions, & Other Important Information
		Network Provider (You will pay the least)	Out-of-Network Provider (You will pay the most)	
	Childbirth/delivery professional services	35% <u>coinsurance</u>	Not Covered	<u>Cost sharing</u> does not apply to certain <u>preventive services</u> . Depending on the type of services, <u>coinsurance</u> may apply. Maternity care may include tests and services described elsewhere in the SBC (i.e. ultrasound).
	Childbirth/delivery facility services	35% <u>coinsurance</u>	Not Covered	none
If you need help recovering or have other special health needs	<u>Home health care</u>	\$70 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	Limited to 40 visits per calendar year.
	<u>Rehabilitation services</u>	\$70 <u>copay</u> per outpatient visit, <u>deductible</u> does not apply	Not Covered	Limits per calendar year: Physical, speech and occupational therapy combined limit 60 visits per condition per calendar year.
	<u>Habilitation services</u>	\$70 <u>copay</u> per outpatient visit, <u>deductible</u> does not apply	Not Covered	Limits per calendar year: Physical, speech and occupational therapy combined limit 60 visits per condition per calendar year.
	<u>Skilled nursing care</u>	35% <u>coinsurance</u>	Not Covered	Limited to 200 days per calendar year.
	<u>Durable medical equipment</u>	35% <u>coinsurance</u>	Not Covered	<u>Preauthorization</u> required for DME over \$500 or there is no coverage.
	<u>Hospice services</u>	35% <u>coinsurance</u>	Not Covered	none
If your child needs dental or eye care	Children's eye exam	\$30 <u>copay</u> per visit, <u>deductible</u> does not apply	Not Covered	Limited to 1 exam per 12-month period. Covered for individuals up to the age of 19.
	Children's glasses	50% <u>coinsurance</u> , <u>deductible</u> does not apply	Not Covered	Limited to 1 pair every 12 months. Costs may increase depending on the frames selected. You may choose contact lenses instead of eyeglasses. The benefit doesn't cover both. Covered for individuals up to the age of 19.
	Children's dental check-up	0% <u>coinsurance</u>	Not Covered	Limited to 2 times per 12 months. Additional limitations may apply. Covered for individuals up to the age of 19.

Excluded Services & Other Covered Services:

Services Your <u>Plan</u> Generally Does NOT Cover (Check your policy or <u>plan</u> document for more information and a list of any other excluded services.)		
<ul style="list-style-type: none">• Acupuncture• Cosmetic surgery• Dental care	<ul style="list-style-type: none">• Long-term care• Non-emergency care when travelling outside - the U.S.	<ul style="list-style-type: none">• Private duty nursing• Routine eye care• Routine foot care• Weight loss programs
Other Covered Services (Limitations may apply to these services. This isn't a complete list. Please see your <u>plan</u> document.)		
<ul style="list-style-type: none">• Bariatric Surgery	<ul style="list-style-type: none">• Chiropractic Care• Hearing Aids	<ul style="list-style-type: none">• Infertility Treatment – Cycle limits may apply.

Your Rights to Continue Coverage: There are agencies that can help if you want to continue your coverage after it ends. The contact information for those agencies is: www.dfs.ny.gov/index.htm Department of Labor's Employee Benefits Security Administration at 1-866-444-EBSA (3272) or www.dol.gov/ebsa/healthreform. Department of Health and Human Services, Center for Consumer Information and Insurance Oversight, at 1-877-267-2323 x61565 or www.cciio.cms.gov. Other coverage options may be available to you too, including buying individual insurance coverage through the Health Insurance Marketplace. For more information about the Marketplace, visit www.HealthCare.gov or call 1-800-318-2596.

Your Grievance and Appeals Rights: There are agencies that can help if you have a complaint against your plan for a denial of a claim. This complaint is called a grievance or appeal. For more information about your rights, look at the explanation of benefits you will receive for that medical claim. Your plan documents also provide complete information to submit a claim appeal or a grievance for any reason to your plan. For more information about your rights, this notice, or assistance, contact: your human resource department, the Employee Benefits Security Administration at 1-866-444-3272 or www.dol.gov/ebsa/healthreform or the New York Department of Financial Services at 1-800-342-3736 or www.dfs.ny.gov/index.htm.

Does this plan provide Minimum Essential Coverage? Yes

Minimum Essential Coverage generally includes plans, health insurance available through the Marketplace or other individual market policies, Medicare, Medicaid, CHIP, TRICARE, and certain other coverage. If you are eligible for certain types of Minimum Essential Coverage, you may not be eligible for the premium tax credit.

Does this plan meet the Minimum Value Standards? Yes

If your plan doesn't meet the Minimum Value Standards, you may be eligible for a premium tax credit to help you pay for a plan through the Marketplace.

Language Access Services:

Spanish (Español): Para obtener asistencia en Español, llame al 1-866-633-2446.

Tagalog (Tagalog): Kung kailangan ninyo ang tulong sa Tagalog tumawag sa 1-866-633-2446.

Chinese (中文): 如果需要中文的帮助, 请拨打这个号码 1-866-633-2446.

Navajo (Dine): Dinek'ehgo shika at'ohwol ninisingo, kwijigo holne' 1-866-633-2446

To see examples of how this plan might cover costs for a sample medical situation, see the next section.

About these Coverage Examples:



This is not a cost estimator. Treatments shown are just examples of how this plan might cover medical care. Your actual costs will be different depending on the actual care you receive, the prices your providers charge, and many other factors. Focus on the cost sharing amounts (deductibles, copayments and coinsurance) and excluded services under the plan. Use this information to compare the portion of costs you might pay under different health plans. Please note these coverage examples are based on self-only coverage.

Peg is Having a Baby (9 months of in-network pre-natal care and a hospital delivery)		Managing Joe's type 2 Diabetes (a year of routine in-network care of a well-controlled condition)		Mia's Simple Fracture (in-network emergency room visit and follow up care)	
■ The <u>plan's</u> overall <u>deductible</u>	\$3,000	■ The <u>plan's</u> overall <u>deductible</u>	\$3,000	■ The <u>plan's</u> overall <u>deductible</u>	\$3,000
■ <u>Specialist</u> copay	\$70	■ <u>Specialist</u> copay	\$70	■ <u>Specialist</u> copay	\$70
■ Hospital (facility) <u>coinsurance</u>	35%	■ Hospital (facility) <u>coinsurance</u>	35%	■ Hospital (facility) <u>coinsurance</u>	35%
■ Other <u>coinsurance</u>	35%	■ Other <u>coinsurance</u>	35%	■ Other <u>coinsurance</u>	35%
This EXAMPLE event includes services like: <u>Specialist</u> office visits (<i>prenatal care</i>) Childbirth/Delivery Professional Services Childbirth/Delivery Facility Services <u>Diagnostic tests</u> (<i>ultrasounds and blood work</i>) <u>Specialist</u> visit (<i>anesthesia</i>)		This EXAMPLE event includes services like: <u>Primary care physician</u> office visits (<i>including disease education</i>) <u>Diagnostic tests</u> (<i>blood work</i>) Prescription drugs <u>Durable medical equipment</u> (<i>glucose meter</i>)		This EXAMPLE event includes services like: <u>Emergency room care</u> (<i>including medical supplies</i>) <u>Diagnostic test</u> (<i>x-ray</i>) <u>Durable medical equipment</u> (<i>crutches</i>) <u>Rehabilitation services</u> (<i>physical therapy</i>)	
Total Example Cost	\$12,700	Total Example Cost	\$5,600	Total Example Cost	\$2,800
In this example, Peg would pay: Cost Sharing		In this example, Joe would pay: Cost Sharing		In this example, Mia would pay: Cost Sharing	
<u>Deductibles</u>	\$3,000	<u>Deductibles</u>	\$800	<u>Deductibles</u>	\$1,200
<u>Copayments</u>	\$200	<u>Copayments</u>	\$1,200	<u>Copayments</u>	\$300
<u>Coinsurance</u>	\$2,400	<u>Coinsurance</u>	\$0	<u>Coinsurance</u>	\$0
What isn't covered		What isn't covered		What isn't covered	
Limits or exclusions	\$60	Limits or exclusions	\$0	Limits or exclusions	\$0
The total Peg would pay is	\$5,660	The total Joe would pay is	\$2,000	The total Mia would pay is	\$1,500

The plan would be responsible for the other costs of these EXAMPLE covered services.

We do not treat members differently because of sex, age, race, color, disability or national origin.

If you think you were treated unfairly because of your sex, age, race, color, disability or national origin, you can send a complaint to the Civil Rights Coordinator.

Online: UHC_Civil_Rights@uhc.com

Mail: Civil Rights Coordinator. UnitedHealthcare Civil Rights Grievance. P.O. Box 30608 Salt Lake City, UTAH 84130

You must send the complaint within 60 days of when you found out about it. A decision will be sent to you within 30 days. If you disagree with the decision, you have 15 days to ask us to look at it again. If you need help with your complaint, please call the toll-free number listed within this Summary of Benefits and Coverage (SBC) , TTY 711, Monday through Friday, 8 a.m. to 8 p.m.

You can also file a complaint with the U.S. Dept. of Health and Human Services.

Online: <https://ocrportal.hhs.gov/ocr/portal/lobby.jsf>

Complaint forms are available at <http://www.hhs.gov/ocr/office/file/index.html>.

Phone: Toll-free 1-800-368-1019, 800-537-7697 (TDD)

Mail: U.S. Dept. of Health and Human Services. 200 Independence Avenue, SW Room 509F, HHH Building Washington, D.C. 20201

We provide free services to help you communicate with us. Such as, letters in other languages or large print. Or, you can ask for an interpreter. To ask for help, please call the number contained within this Summary of Benefits and Coverage (SBC) , TTY 711, Monday through Friday, 8 a.m. to 8 p.m.

ATENCIÓN: Si habla **español (Spanish)**, hay servicios de asistencia de idiomas, sin cargo, a su disposición. Llame al número gratuito que aparece en este Resumen de Beneficios y Cobertura (Summary of Benefits and Coverage, SBC).

請注意：如果您說**中文 (Chinese)**，我們免費為您提供語言協助服務。請撥打本福利和承保摘要 (Summary of Benefits and Coverage, SBC) 內所列的免付費電話號碼。

XIN LƯU Ý: Nếu quý vị nói tiếng **Việt (Vietnamese)**, quý vị sẽ được cung cấp dịch vụ trợ giúp về ngôn ngữ miễn phí. Vui lòng gọi số điện thoại miễn phí ghi trong bản Tóm lược về quyền lợi và đài thọ bảo hiểm (Summary of Benefits and Coverage, SBC) này.

알림: **한국어(Korean)**를 사용하시는 경우 언어 지원 서비스를 무료로 이용하실 수 있습니다. 본 혜택 및 보장 요약서(Summary of Benefits and Coverage, SBC)에 기재된 무료전화번호로 전화하십시오.

PAUNAWA: Kung nagsasalita ka ng **Tagalog (Tagalog)**, may makukuha kang mga libreng serbisyo ng tulong sa wika. Pakitawagan ang toll-free na numerong nakalista sa Buod na ito ng Mga Benepisyo at Saklaw (Summary of Benefits and Coverage o SBC).

ВНИМАНИЕ: бесплатные услуги перевода доступны для людей, чей родной язык является **русском (Russian)**. Позвоните по бесплатному номеру телефона, указанному в данном «Обзоре льгот и покрытия» (Summary of Benefits and Coverage, SBC).

تنبيه: إذا كنت تتحدث العربية (Arabic)، فإن خدمات المساعدة اللغوية المجانية متاحة لك. يُرجى الاتصال برقم الهاتف المجاني المدرج بداخل مخلص المزايا والتغطية (Summary of Benefits and Coverage، SBC) هذا.

ATANSYON: Si w pale **Kreyòl ayisyen (Haitian Creole)**, ou kapab benefisye sèvis ki gratis pou ede w nan lang pa w. Tanpri rele nimewo gratis ki nan Rezime avantaj ak pwoteksyon sa a (Summary of Benefits and Coverage, SBC).

ATTENTION : Si vous parlez **français (French)**, des services d'aide linguistique vous sont proposés gratuitement. Veuillez appeler le numéro sans frais figurant dans ce Sommaire des prestations et de la couverture (Summary of Benefits and Coverage, SBC).

UWAGA: Jeżeli mówisz po **polsku (Polish)**, udostępniłszy darmowe usługi tłumacza. Prosimy zadzwonić pod bezpłatny numer podany w niniejszym Zestawieniu świadczeń i refundacji (Summary of Benefits and Coverage, SBC).

ATENÇÃO: Se você fala **português (Portuguese)**, contate o serviço de assistência de idiomas gratuito. Ligue para o número gratuito listado neste Resumo de Benefícios e Cobertura (Summary of Benefits and Coverage - SBC).

ATTENZIONE: in caso la lingua parlata sia l'**italiano (Italian)**, sono disponibili servizi di assistenza linguistica gratuiti. Chiamate il numero verde indicato all'interno di questo Sommario dei Benefit e della Copertura (Summary of Benefits and Coverage, SBC).

ACHTUNG: Falls Sie **Deutsch (German)** sprechen, stehen Ihnen kostenlos sprachliche Hilfsdienstleistungen zur Verfügung. Bitte rufen Sie die in dieser Zusammenfassung der Leistungen und Kostenübernahmen (Summary of Benefits and Coverage, SBC) angegebene gebührenfreie Rufnummer an.

注意事項：日本語 (Japanese) を話される場合、無料の言語支援サービスをご利用いただけます。本「保障および給付の概要」(Summary of Benefits and Coverage, SBC) に記載されているフリーダイヤルにてお電話ください。

توجه: اگر زبان شما فارسی (Farsi) است، خدمات امداد زبانی به طور رایگان در اختیار شما می باشد. لطفاً با شماره تلفن رایگان ذکر شده در این خلاصه مزایا و پوشش (Summary of Benefits and Coverage، SBC) تماس بگیرید.

ध्यान दें: यदि आप **हिंदी (Hindi)** बोलते हैं, आपको भाषा सहायता सेवाएं, निःशुल्क उपलब्ध हैं। लाभ और कवरेज (Summary of Benefits and Coverage, SBC) के इस सारांश के भीतर सूचीबद्ध टोल फ्री नंबर पर कॉल करें।

CEEB TOOM: Yog koj hais Lus **Hmoob (Hmong)**, muaj kev pab txhais lus pub dawb rau koj. Thov hu rau tus xov tooj hu dawb teev muaj nyob ntawm Tsab Ntawv Nthuav Qhia Cov Txiaj Ntsim Zoo thiab Kev Kam Them Nqi (Summary of Benefits and Coverage, SBC) no.

ចំណាប់អារម្មណ៍: បើសិនអ្នកនិយាយភាសាខ្មែរ (Khmer) សេវាជំនួយភាសាដោយឥតគិតថ្លៃ គឺមានសំរាប់អ្នក។ សូមទូរស័ព្ទទៅលេខតតចេញថ្លៃ ដែលមានកត់នៅក្នុង សេចក្តីសង្ខេបអត្ថប្រយោជន៍ និងការរ៉ាប់រង (Summary of Benefits and Coverage, SBC) នេះ។

PAKDAAR: Nu saritaem ti **Ilocano (Ilocano)**, ti serbisyo para ti baddang ti lengguahe nga awanan bayadna, ket sidadaan para kenyan. Maidawat nga awagan ti awan bayad na nu tawagan nga numero nga nakalista iti uneg na daytoy nga Dagup dagiti Benipisyo ken Pannakasakup (Summary of Benefits and Coverage, SBC).

DÍÍ BAA'ÁKONÍNÍZIN: **Diné (Navajo)** bizaad bee yánilti'go, saad bee áka'anída'awo'ígíí, t'áá jíík'eh, bee ná'ahóót'i'. T'áá shqodí Naaltsoos Bee 'Aa'áhayáni dóó Bee 'Ak'é'asti' Bee Baa Hane'í (Summary of Benefits and Coverage, SBC) biyi' t'áá jíík'ehgo béesh bee hane'í biká'ígíí bee hodfilnih.

OGOW: Haddii aad ku hadasho **Soomaali (Somali)**, adeegyada taageerada luqadda, oo bilaash ah, ayaad heli kartaa. Fadlan wac lambarka bilaashka ah ee ku yaalla Soo-koobitaanka Dheefaha iyo Caymiska (Summary of Benefits and Coverage, SBC).



**Department of
Design and
Construction**

PROJECT ID: SANDBOMB

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000
WEBSITE www.nyc.gov/buildnyc

VOLUME 2 OF 3

**PROJECT LABOR AGREEMENT
INFORMATION FOR BIDDERS
CONTRACT
PERFORMANCE AND PAYMENT BONDS
SCHEDULE OF PREVAILING WAGES
GENERAL CONDITIONS**

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR THE PROJECT

NYPD Bomb Squad Building

**LOCATION:
BOROUGH:
CITY OF NEW YORK**

**100A Rodman's Neck Path, Pelham Bay Park
Bronx, NY 10464**

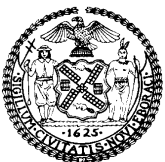
CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

NYPD Bomb Squad Building

Rice-Lipka Architects

Date: October 11, 2022





**Department of
Design and
Construction**

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000
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VOLUME 2 OF 3

**PROJECT LABOR AGREEMENT
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NOTICE TO BIDDERS

This contract is subject to a new 2020 Project Labor Agreement

This contract is subject to the attached Project Labor Agreement (“PLA”) entered into between the City and the Building and Construction Trades Council of Greater New York (“BCTC”) affiliated Local Unions. By submitting a bid, the Contractor agrees that if awarded the Contract the PLA is binding on the Contractor and all subcontractors of all tiers.

The bidder to be awarded the contract will be required to execute a Letter of Assent prior to award. The Contractor shall include in any subcontract a requirement that the subcontractor, and sub-subcontractors of all tiers, become signatory to and bound to the PLA with respect to the subcontracted work. The Contractor will also be required to have all subcontractors of all tiers execute a Letter of Assent prior to such subcontractors performing any Program Work.

Bidders are advised that the City of New York and City agencies have entered into multiple PLAs. The terms of each PLA, while similar, are not identical. Please also note that there are revisions between the 2020 New Construction PLA attached to this bid and the prior 2015 New Construction PLA.

All bidders are urged to review the entire 2020 New Construction PLA prior to submitting a bid.

To the extent that the terms of the PLA conflict with any other terms of the invitation for bids, including the Standard Construction Contract, the terms of the PLA shall govern. Where, however, the invitation for bids, including the Standard Construction Contract, requires the approval of the City/Department, the PLA does not supersede or eliminate that requirement.

This Contract is subject to the apprenticeship requirements of Labor Law § 222 and to apprenticeship requirements established by the Department pursuant to Labor Law § 816-b. Please be advised that the involved trades have apprenticeship programs that meet the statutory requirements of Labor Law § 222(e) and the requirements set by the Department pursuant to Labor Law § 816-b, Contractors and subcontractors who agree to perform the Work pursuant to the PLA are participating in such apprenticeship programs within the meaning of Labor Law § 222(e) and the Department's directive.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program implemented pursuant to New York City Administrative Code § 6-129, the specific requirements of M/WBE participation for this Contract are set forth elsewhere in this bid package. If such requirements are included with this Contract, the City strongly advises Contractors to read those provisions, as well as PLA Article 4, Section 4. A list of certified M/WBE firms may be obtained from the Department of Small Business Services ("DSBS") website at <http://mtprawvwsbswtp1-1.nyc.gov/>, by emailing MWBE@sbs.nyc.gov, or by calling the DSBS certification hotline at (212) 513-6311, or by visiting or writing the DSBS at One Liberty Plaza, 11th Floor, New York, New York, 10006.

The local collective bargaining agreements ("CBAs") that are incorporated into the PLA as PLA Schedule A Agreements are available from the Department's Agency Chief Contract Officer upon the request of any prospective bidder.

Please note that the "PLA Schedule A" is distinct from the Department's Schedule A that is a part of this invitation for bids.

2020 New Construction Project Labor Agreement Frequently Asked Questions

1. **Q.** Does a Contractor need to be signatory with the unions in the NYC Building and Construction Trades Council (“BCTC”) in order to bid on projects under the PLA?

A. No, any contractor may bid by signing and agreeing to the terms of the PLA. The contractor need not be signatory with these unions by any other labor agreement or for any other project.

2. **Q.** Does a Contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?

A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects. Contractors do not need to sign any additional agreements (*e.g.*, a collective bargaining agreement) with a union aside from the Letter of Assent to work on a PLA project.

3. **Q.** Do the provisions of the PLA apply equally to subcontractors as well as contractors and how does the PLA affect the subcontractors that a bidder may utilize on the project?

A. Yes, the PLA applies to subcontractors and all subcontractors performing Program Work must agree to become party to the PLA. Subject to the Agency’s approval of subcontractors pursuant to Article 17 of the Standard Construction Contract, a Contractor may use any subcontractor, union or non-union, as long as the subcontractor signs the Letter of Assent. See PLA Article 2, Section 8.

4. **Q.** Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?

A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. However, subcontractors performing Program Work will be required to sign the Letter of Assent prior to being approved by the Agency.

5. **Q.** May a Contractor or subcontractor use any of its existing employees to perform this work?

A. Generally, labor will be referred to the Contractor from the respective signatory local unions. However, Contractors and subcontractors may use up to 12% of their existing, qualifying labor force for this work. Certified M/WBEs for which participation goals are set pursuant to NYC Administrative Code § 6-129 that are not signatory to any Schedule A collective bargaining agreements (“CBAs”) may use their existing employees for the 2nd, 4th, 6th and 8th employee (per trade) needed on the job if their contracts are valued at or under \$2,000,000. Any additional workers will be referred to the Contractor in accordance with the 12% referral requirements set forth in the PLA. See PLA Article 4, Section 2.

6. **Q.** Must the City set M/WBE participation goals for the particular project or contract in order for a certified M/WBE to utilize the provisions of PLA Article 4, Section 2(C)?

A. No. PLA Article 4, Section 2(C) specifies what categories of M/WBEs are eligible to take advantage of this provision (i.e., those M/WBEs for which the City is authorized to set participation goals under § 6-129). For purposes of Article 4, Section 2(C), it is not necessary for the project to be subject to § 6-129 or for the City to have actually set participation goals for the particular contract or project. The result is the same where a project receives State funding and therefore is subject to the requirements of Article 15-A of the Executive Law.

7. **Q.** May a Contractor bring in union members from locals that are not signatory unions?

A. Referrals will be from the respective signatory locals and/or locals listed in Schedule A of the PLA. Contractors may utilize ‘traveler provisions’ contained in the local CBAs where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

8. **Q.** Does a non-union employee working under the PLA automatically become a union member?

A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA and nothing in the PLA requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work. Non-union employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs except in certain circumstances as set forth in the PLA. See PLA Article 4, Section 6 and Article 11.

9. **Q.** Are all Contractors and subcontractors working under the PLA, including non-union Contractors and Contractors signatory to CBAs with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?

A. Except in certain circumstances, as described in the following paragraph, Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly trustee employee benefit funds designated in the Schedule A CBAs and required to be paid on public works under any applicable prevailing wage law. The Agency may withhold from amounts due the Contractor any amounts required to be paid, but not actually paid into any such fund by the Contractor or a subcontractor. See PLA Article 11, Section 2.

Non-union Contractors with bona fide private benefit plans that satisfy the requirements of Labor Law 220 will not be required to pay into union benefit funds for their employees working pursuant to Article 4, Section 2 (B) and (C) (“Core Employees”) who are already covered under their bona fide private benefit plans. Supplemental

benefit funds in excess of the annualized value of the private benefit plans will be paid directly to workers as additional wages in compliance with Labor Law § 220. At the time of contract award, the Contractor shall make available to the contracting Agency a complete set of plan documents for each private benefit plan into which contributions will be made and/or coverage provided. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Labor Law § 220. See PLA Article 11, Section 2.

10. **Q.** When do Core Employees become eligible for union benefits?

A. Union benefit plans have their own plan documents that determine eligibility and workers will become eligible for certain benefits at different points in time. Contractors who will have Core Employees should speak with the respective union(s) as to benefit eligibility thresholds. Employees that may remain unaffiliated with any local union at the completion of their employment may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds.

11. **Q.** What happens if a Contractor or subcontractor fails to make a required payment to a designated employee benefit fund?

A. The PLA sets forth a process for unions to address a Contractor or a subcontractor's failure to make required payments. The process includes potentially the direct payment by the City to the benefit fund of monies owed and the corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2.

Upon notification by a union or fringe benefit fund that a Contractor is delinquent in its payment of benefits and a determination by the Agency that the union or fund has submitted appropriate documentation of such delinquency, the Agency will thereafter require the Contractor to submit cancelled checks or other equivalent proof of payment of benefit contributions with certified payroll reports for work covered by this PLA on which the Contractor is engaged.

The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

12. **Q.** Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?

A. Yes. By agreeing to perform the Work subject to the PLA, the bidder demonstrates compliance with the apprenticeship requirements imposed by this Invitation for Bids.

13. **Q.** Who decides on the number of workers needed?

A. Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the determination as to the number of employees to be hired and the qualifications therefore and the promotion, transfer, and layoff of its employees. See PLA Article 6, Section 1.

14. **Q.** What happens if a union does not provide a worker within 48 hours from the request (Saturdays, Sundays, and holidays excepted)?
- A.** In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source.
15. **Q.** May a Contractor discharge a union referral for lack of productivity?
- A.** Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the right to discipline or discharge for just cause its employees. See PLA Article 6, Section 1.
16. **Q.** May a contractor assign a management person to site?
- A.** Yes. Managers are not subject to the provisions of the PLA, so there is no restriction on management and/or other non-trade personnel, as long as such personnel do not perform trade functions. See Article 3, Section 1.
17. **Q.** What type of work can Stewards perform?
- A.** All Stewards must be working Stewards (*i.e.*, they must be performing Program Work). In addition, Stewards may perform other tasks such as receiving complaints or grievances from other employees of the Steward's trade. Stewards may not determine when overtime is worked. Stewards are entitled to the same wages as other employees of that trade. See PLA Article 5, Sections 2 and 3.
18. **Q.** Can a Contractor utilize apprentices?
- A.** Contractors are permitted to utilize apprentices so long as the ratios between journeyman and apprentice do not exceed the allowable ratios set by the New York State Department of Labor ("NYSDOL"). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.
19. **Q.** What is HireNYC Construction Careers?
- A.** HireNYC Construction Careers is an initiative to advance career opportunities within the construction industry. The initiative has a target goal of 30% of all hours worked on PLA projects are performed by workers who reside in NYCHA housing or zip codes where 15% or more of the residences are below poverty. When a Contractor requests employees, the trades will take into account the target goals when they refer additional workers.

20. **Q.** Does the PLA provide a standard work day across all the signatory trades?
- A.** Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. See PLA Article 12, Section 1.
21. **Q.** Does the PLA create a common holiday schedule for all the signatory trades?
- A.** Yes, the PLA recognizes nine common holidays. See PLA Article 12, Section 4.
22. **Q.** Are workers entitled to holiday pay if they do not work on the holiday?
- A.** No. Workers are only entitled to pay if they work on the holiday. See PLA Article 12, Section 4.
23. **Q.** May the Contractor schedule overtime work, including work on a weekend?
- A.** Yes, the PLA permits the Contractor to schedule overtime work, including work on weekends. See PLA Article 12, Sections 2, 3, and 5. To the extent that the Agency's approval is required before a Contractor may schedule or be paid for overtime, that approval is still required notwithstanding the PLA language.
24. **Q.** Are overtime payments affected by the PLA?
- A.** Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trade's CBA.
25. **Q.** Does the PLA contain special provisions for the staffing of temporary services?
- A.** Yes. Where temporary services are required by specific request of the Agency or construction manager, they shall be provided by the Contractor's existing employees during working hours in which a shift is scheduled for employees of the Contractor. The need for temporary services during non-working hours will be determined by the Agency or construction manager. There will be no stacking of trades on temporary services. See PLA Article 15.
26. **Q.** What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?
- A.** The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8. The usual reporting pay requirement of two hours for employees who report to their work location pursuant to their regular schedule does not apply when the National Weather Service issues a Weather Advisory

and the Contractor speaks to the employee at least four hours before their shift starting time. See PLA Article 12, Section 6.

27. **Q.** Should a local collective bargaining agreement of a signatory union expire during the project will a work stoppage occur on a project subject to the PLA?

A. No. All the signatory unions are bound by the 'no strike' agreement as to the PLA work. Work will continue under the PLA and the otherwise expired local CBA(s) until the new local CBA(s) are negotiated and in effect. See PLA Articles 7 and 19.

28. **Q.** May a Contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the Contractor is a signatory to the PLA?

A. Yes. The PLA applies ONLY to work under the PLA and does not regulate labor relations at other sites even if those sites are in close proximity to PLA work.

29. **Q.** If a Contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?

A. While PLAs often look similar to each other, and particular clauses are often used in multiple agreements, each PLA is a unique document and should be examined accordingly.

30. **Q.** What happens if a dispute occurs between the Contractor and an employee during the project?

A. The PLA contains a grievance and arbitration process to resolve disputes between the Contractor and the employees. See PLA Article 9.

31. **Q.** What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?

A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. A copy of the NY Plan is available upon request from the Agency. The PLA provides that work is not to be disrupted or interrupted pending the resolution of any jurisdictional dispute. The work proceeds as assigned by the Contractor until the dispute is resolved. See PLA Article 10.

32. **Q.** How do the referral rules work for Operating Engineers Locals 14 and 15?

A. If there is Program Work within the jurisdiction of Operating Engineers Locals 14 or 15, the contractor shall request labor from the appropriate local union. If the locals provide labor consistent with the referral provisions outlined in Article 4, Section 2, the terms of the Local 14 CBA or Local 15 CBA will apply to that work. However, if the locals do not provide labor for that work, the terms of the PLA will apply to such work.

District Councils & Affiliates Contact Information

Bricklayers & Allied Craftworkers Local 1
 4 Court Square
 Long Island City, NY 11101
 Business Manager: Jack Argila
 P: (718) 392-0525
 email: jargila@bac1ny.com

BoilerMakers Local 5
 24 Van Siclen Avenue
 Floral Park, NY 11001
 Business Manager: Steve Ludwigson
 P: 516-326-2500
 email: boilermakerslocal5@verizon.net

Building Concrete & Excavating Laborers Local 731
 34-11 35th Avenue
 Astoria, NY 11106
 Business Manager: Joseph D'Amato
 P: 718-706-0720
 email: joed731bm@gmail.com

***NYC & Vicinity District Council of Carpenters**
 395 Hudson Street, 9th Fl
 New York, NY 10014
 Business Manager: Joe Geiger
 P: 212-366-7500
 email: jgeiger@nycdistrictcouncil.org

***Concrete Workers District Council No. 16**
 30-56 Whitestone Expressway Suite 320
 Flushing, NY 11354
 Business Manager: Angelo Angelone
 P: 718-886-0516
 email: ccwdc16@yahoo.com

Cement Masons Local #780
 150-50 14th Rd Suite 4
 Whitestone, NY 11357
 Business Manager: Gino Castingnoli
 P: 718-357-3750
 email: gcastignoli@noedc.org

Electrical Local 3
 158-11 Harry Van Arsdale Jr. Avenue
 Flushing, NY 11365
 Business Manager: Chris Erikson
 P: 718-591-4000
 email: cerikson@local3ibew.org

Roofers & Waterproofers Local 8
 12-11 43rd Avenue
 LIC, NY 11101
 Business Manager: Nick Siciliano
 P: 718-361-1169
 email: nick@fundsforlocal8roofers.org

SheetMetal Workers Local 28
 500 Greenwich Street
 New York, NY 10013
 Business Manager: Eric Meslin
 P: 212-941-7700
 email: emeslin@local28union.com

SheetMetal Workers Local 137
 21-42 44th Drive
 LIC, NY 11101
 Business Manager: Dante Dano
 P: 718-937-4514
 email: dante@local137.com

Elevator Constructors Local 1
 47-24 27th Avenue
 LIC, NY 11101
 Business Manager: Lenny Legotte
 P: 718-767-7004
 email: llegotte@localoneiuec.com

Engineers Local 14
 141-57 Northern Boulevard
 Flushing, NY 11354
 Business Manager: Edwin Christian
 P: 718-939-0600
 email: lynnd@iuoelocal14.com

Engineers Local 15, 15A, 15B, 15C & 15D
 44-40 11th Street
 Long Island City, 11101
 Business Manager: Tom Callahan
 P: 212-929-5327
 email: love015@aol.com

Engineers Local 30
 16-16 Whitestone Expressway
 Whitestone, NY 11357
 Business Manager: William Lynn
 P: 718-847-8484
 email: williamlynn@iuoelocal30.org

Engineers Local 94
 331-337 West 44th Street
 New York, NY 10036
 Business Manager: Kuba Brown
 P: 212-245-7040
 email: kubabrown@local94.com

Heat & Frost Insulators Local 12
 35-53 24th Street
 LIC, NY 11101
 Business Manager: John Jovic
 P: 718-784-3456
 email: john@insulatorslocal12.com

Heat & Frost Insulators Local 12A
 1536 127th Street
 College Point, NY 11356
 Business Manager: Jamie Soto
 P: 718-886-7226
 email: jsoto.12a@aol.com

Steamfitters Local 638
 32-32 48th Avenue
 LIC, NY 11101
 Business Manager: Scott Roche
 P: 718-392-3420
 email: popparoch@gmail.com

Teamsters Local 282
 2500 Marcus Avenue
 Lake Success, NY 11042
 Business Manager: Tom Gesauldi
 P: 516-488-2822 #141
 email: tgesualdi282@yahoo.com

Teamsters Local 814
 21-42 44th Drive
 LIC, NY 11101
 Business Manager: Jason Ide
 P: 718-609-6407
 email: jasonl@ibt814.com

***Iron Workers District Council**
 227 E 56th Street Suite 300A
 New York, NY 10022
 Business Manager: James Mahoney
 P: 212-302-1868
 email: jmahoney@iwintl.org

***Mason Tenders District Council**
 520 8th Avenue
 New York NY 10018
 Business Manager: Robert Bonanza
 P: 212-452-9400
 email: RBonanza@MasonTenders.org

***Painters District Council No. 9**
 45 West 14th Street
 New York, NY 10011
 Business Manager: Joe Azzopardi
 P: 212-255-2950
 email: joeazzo1281@yahoo.com

Pavers & Roadbuilders DC No.1
 136-25 37th Avenue, Suite 502
 Flushing NY 11354
 Business Manager: Keith Lozcalzo
 P: 718-886-3310
 email: klozcalzo@aol.com

Plasterers Local 262
 2241 Conner Street
 Bronx, NY 10466
 Business Manager: Dale Alleyne
 P: 718-547-5440
 email: dalleyne@noedc.org

Plumbers Local 1
 50-02 5th Street
 Long Island City, NY 11101
 Business Manager: Michael Apuzzo
 P: 718-738-7500 #5904
 email: mapuzzo@ualocal1.org

Private Sanitation Local 813
 45-18 Court Square, Suite 600
 LIC, NY 11101
 Business Manager: Sean Campbell
 P: 718-937-7010 ext 244
 email: orodriguez@teamsters813.org

Tile Marble & Terrazzo Local 7
 45-34 Court Square
 LIC, NY 11101
 Business Manager: William Hill
 P: 718-786-7648
 email: whill@baclocal7.com

Window Cleaners No. 2 SEIU 32BJ
 101 Avenue of the Americas
 New York, NY 10013
 Business Manager: Gerard McEneaney
 P: 212-539-2904
 email: gmceneaney@seiu32bj.org

Carpenters District Council

NYC & Vicinity District Council of Carpenters

395 Hudson Street, 9th Fl

New York, NY 10014

Business Manager: Joe Geiger

P: 212-366-7500

Carpenters Local 20
900 South Avenue
Suite 53
Staten Island, NY 10310

Carpenters Local 926
373 96th Street
Brooklyn, NY 11209
P: 718-491-0926

Carpenters Local 45
214-38 Hillside Avenue
Queens Village, NY 11427
P: 718-464-6016

Dockbuilders/Timberman Local 1556
395 Hudson Street 1st Floor
New York, NY 10014

Carpenters Local 157
395 Hudson Street 1st Fl
New York, NY 10014
P: 212-685-0567

Millwright & Machinery Erectors Local 740
89-07 Atlantic Avenue
Woodhaven, NY 11412
P: 718-849-3636

Concrete Workers District Council No. 16

*Concrete Workers District Council No. 16
30-56 Whitestone Expressway Suite 320
Flushing, NY 11354
Business Manager: Angelo Angelone
P: 718-886-36432*

Cement & Concrete Workers Local 6A
30-56 Whitestone Expressway
Suite 310
Flushing, NY 11354
Business Manager: Anthony Amella Jr
P: 718-888-9383
email: ccwl6a@aol.com

Cement & Concrete Workers Local 20
36-36 33rd Street
Suite 302
LIC, NY 11106
Business Manager: John Peters
P: 718-361-8131
email: local20@laborerslocal20.org

Cement & Concrete Workers Local 18A
4235 Katonah Avenue
Bronx, NY 10470
Business Manager: Kieran O'Sullivan
P: 718-798-9035
email: local18a@yahoo.com

Iron Workers District Council

**Iron Workers District Council*

227 E 56th Street Suite 300A

New York, NY 10022

Business Manager: James Mahoney

P: 212-302-1868

email: jmahoney@iwintl.org

IronWorkers Local 361

89-19 97th Avenue

Ozone Park, NY 11416

Business Manager: Matthew Chartrand

P: 718-322-1016/17

email: mchartrand@local361.com

Metal Lathers Local 46

1332 Third Avenue

New York, NY 10021

Business Manager:

P: 212-737-0500

email:

Ironworkers Local 40

451 Park Avenue South

New York, NY 10016

Business Manager: Bob Walsh

P: 212-889-1320

email: bobwalsh@ironworkers.net

Derrickmen & Riggers Local 197

35-53 24th Street

LIC, NY 11106

Business Manager: William Hayes

P: 718-361-6534

email: billhayes197@yahoo.com

Ornamental IronWorkers Local 580

501 West 42nd Street

New York, NY 10036

Business Manager: Pete Myers

p: 212-594-1662

email: pmyers@Local-580.com

Mason Tenders District Council

****Mason Tenders District Council***

520 8th Avenue

New York NY 10018

Business Manager: Robert Bonanza

P: 212-452-9400

email: RBonanza@MasonTenders.org

Construction & General Laborers Local 79

520 8th Avenue

New York, NY 10018

Business Manager: Michael Prohaska

P: 212-465-7900

email: mpro@laborerslocal79.org

Asbestos Lead & Hazardous Waste Laborers Local 78

30 Cliff Street

New York, NY 10038

Business Manager: Pawell Gruchacz

P: 212-227-4803

email: pgruchacz@local78.org

Painters District Council # 9

**Painters District Council No. 9*

45 West 14th Street

New York, NY 10011

Business Manager: Joseph Azzopardi

P: 212-255-2950

Drywall Tapers Local 1974

265 West 14th Street

New York, NY 10011

Business Manager: Sal Marsala

P: 212-242-8500

email:

Painters Structural Steel Local 806

40 West 27th Street

New York, NY 10001

Business Manager: Brian Casey

P: 212-447-1838/0149

email: bcasey6009@gmail.com

Glaziers Local 1087

45 West 14th Street

New York, NY 10011

Business Manager: Steve Birmingham

P: 212-924-5200

email: bermo1087@gmail.com

Metal Polishers Local 8A-28A

36-18 33rd Street 2nd Floor

LIC, NY 11106

Business Manager:

P: 718-361-1770

email:

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

**PROJECT LABOR AGREEMENT
COVERING SPECIFIED
NEW CONSTRUCTION OF IDENTIFIED CITY OWNED BUILDINGS
AND STRUCTURES**

2020 – 2024

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**PROJECT LABOR AGREEMENT COVERING IDENTIFIED NEW CONSTRUCTION
OF NEW YORK CITY OWNED BUILDINGS & STRUCTURES**

ARTICLE 1 - PREAMBLE

WHEREAS, the City of New York desires to provide for the cost efficient, safe, quality, and timely completion of certain new construction work (“Program Work,” as defined in Article 3) in a manner designed to afford the lowest costs to the Agencies covered by this Agreement, and the public it represents, and the advancement of permissible statutory objectives;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

(1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost-effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;

(2) expediting the construction process and otherwise minimizing the disruption to the covered Agencies’ ongoing operations at the facilities that are the subject of the Agreement;

(3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;

(4) standardizing the terms and conditions governing the employment of labor on Program Work;

(5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

(6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

(7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

(8) fostering increased participation by Minority and Women-owned Business Enterprises (“MWBEs”);

(9) encouraging the development of pathways to construction careers;

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

- (10) ensuring a reliable source of skilled and experienced labor; and
- (11) securing applicable New York State Labor Law exemptions.

WHEREAS, the Building and Construction Trades Council of Greater New York and Vicinity its participating affiliated Local Unions and their members, desire to assist the City in meeting these operational needs and objectives as well as to provide for stability, security and work opportunities which are afforded by this Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Program Work safety conditions for both workers and the community in the project area.

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement (“Agreement”) entered into by the City of New York (“City”), acting through the Department of Design and Construction, on behalf of itself and the Agencies covered herein, including in their capacity as construction manager of covered projects and/or on behalf of any third party construction manager which may be utilized, and the Building and Construction Trades Council of Greater New York and Vicinity (“Council” or “BCTC”) (on behalf of itself) and the signatory affiliated Local Unions (“Unions” or “Local Unions”). The Council and each signatory Local Union hereby warrant and represents that it has been duly authorized to enter into this Agreement.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

A. The term “Agency” means the Department of Design and Construction (“DDC”) or such other City agency that executes an addendum pursuant to Article 3, Section 1(A) of this Agreement; with respect to Program Work as defined in Article 3, the New York City Agency that awards a particular contract subject to this Agreement may be referred to hereafter as the “Agency”;

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

B. The term “Agreement” means this project labor agreement (“PLA”), the applicable Schedule “A” Collective Bargaining Agreements (each a “CBA”) identified in Schedule “A”, and each Exhibit hereto;

C. The term “BCTC” refers to the Building and Construction Trades Council of Greater New York and Vicinity. The terms “BCTC” and “Council” are used interchangeably;

D. The term “Contractor(s)” shall include any Construction Manager, General Contractor and all other contractors, and subcontractors of all tiers engaged in Program Work within the scope of this Agreement as defined in Article 3. When an Agency acts as Construction Manager, unless otherwise provided, it has the rights and obligations of a “Construction Manager” in addition to the rights and obligations of an Agency;

E. The term “Core Employee” means an employee that has been on a contractor’s payroll consistent with Article 4, Section 2(B) and (C);

F. The term “Minor Repair” means routine repair, service, or maintenance that is recurrent, day to day, periodic scheduled or routine work required to preserve or restore a building, facility or system to working order;

G. The term “HireNYC Construction Careers” refers to the PLA initiative to advance career opportunities for Program Hires;

H. The term “Program Work” is the work covered by this Agreement as defined in Article 3;

I. The term “Program Hire” means an individual that resides in a zip code where at least 15% of the individuals residing in such zip code are below the federal poverty rate and residents of NYCHA housing regardless of zip codes; and

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

J. The term “Union(s)” or “Local Union(s)” refers to the various participating unions affiliated with the BCTC, singularly and collectively.

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: the Agreement is executed by (1) the Council, on behalf of itself, (2) the participating affiliated Local Unions; and (3) the Commissioner of DDC or their designee.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all participating Unions and their affiliates, the Construction Manager (in its capacity as such) and all Contractors of all tiers performing Program Work, as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of all tiers, become signatory and bound by this Agreement with respect to that subcontracted work falling within the scope of Article 3 and all Contractors (including subcontractors) performing Program Work shall be required to sign a “Letter of Assent” in the form annexed hereto as Exhibit “A”. This Agreement shall be administered by the applicable Agency or a Construction Manager or such other designee as may be named by the Agency or Construction Manager, on behalf of all Contractors.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements (each a “CBA”) appended hereto as Schedule “A”, represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other CBA of any type which would otherwise apply to this Program Work, in whole or in part, except for Program Work which falls within the jurisdiction of the Operating Engineers Locals 14 and 15. If Program Work falling within the jurisdiction of Operating Engineers Locals 14 and 15 is accepted by and performed by said

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locals, only then will such work be performed under the terms and conditions set out in the Schedule “A” agreements of Operating Engineers Locals 14 and 15. The CBAs of the affiliated local unions that cover the particular type of construction work to be performed by the contractor, and as set forth in the Schedule “A” list of agreements, shall be deemed the Schedule “A” Collective Bargaining Agreements (“Schedule “A” CBA”) under this Agreement. Where association and independent CBAs for a particular type of construction work are both set forth in Schedule “A”, association members shall treat the applicable association agreement as the Schedule “A” CBA and independent contractors shall treat the applicable independent agreement as the Schedule “A” CBA. Subject to the foregoing, where a subject covered by the provisions of this project labor agreement is also covered by a Schedule “A” CBA, the provisions of this project labor agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Program Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding with respect to Program Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency. Nothing in this Agreement requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work.

SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Construction Manager and any Contractor shall not be liable for any violations of this Agreement by any other Contractor; and the Council and Local Unions shall not be liable for any violations of this Agreement by any other Union.

SECTION 6. THE AGENCY

The Agency (or Construction Manager where applicable) shall require in its bid specifications for all Program Work within the scope of Article 3 that all successful bidders, and their subcontractors of all tiers, become bound by, and signatory to, this Agreement. The Agency (or Construction Manager) shall not be liable for any violation of this Agreement by any Contractor. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Agency or Construction Manager in determining which Contractors shall be awarded contracts for Program Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Program Work, in whole or part, on any project.

**SECTION 7. AVAILABILITY AND APPLICABILITY
TO ALL SUCCESSFUL BIDDERS**

The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for (or subcontractor of) Program Work who becomes signatory thereto, without regard to whether that successful bidder (or subcontractor) performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder (or subcontractor) are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Program Work.

SECTION 8. SUBCONTRACTING

Contractors will subcontract Program Work only to a person, firm or corporation who is or agrees to become party to this Agreement.

ARTICLE 3 - SCOPE OF THE AGREEMENT

SECTION 1. WORK COVERED

A. Program Work shall be limited to new construction contracts bid and let by the Agency (or its Construction Manager where applicable) after the effective date of this Agreement,

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and advertised for public solicitation prior to December 31, 2024, for new construction on any Project which an addendum has been issued pursuant to the provisions set forth below. Additional Projects may be added to this Agreement through a Project-specific addendum approved by an agency of the City of New York and by the BCTC on behalf of itself and its affiliated Local Unions. Each Project-specific addendum is to outline a description of the project being undertaken, the project's location, and the general findings of the feasibility analysis used as the basis of the determination to utilize a PLA on the project.

B. It is understood that, except where the City specifically applies this Agreement to such work in its bid documents, Program Work does not include, and this Agreement shall not apply to, any other work, including:

1. Contracts let and work performed in connection with projects carried over, recycled from, or performed under bids or rebids relating to work that were bid prior to the effective date of this Agreement or after December 31, 2024;

2. Contracts procured on an emergency basis;

3. Contracts with electric utilities, gas utilities, telephone companies, and railroads, except that it is understood and agreed that these entities may only install their work to a demarcation point, *e.g.*, a telephone closet or utility vault, the location of which is determined prior to construction and employees of such entities shall not be used to replace employees performing Program Work pursuant to this Agreement;

4. Contracts for installation of information technology that are not otherwise Program Work;

5. Contracts that predominantly involve Minor Repair work, as defined in Article 2, Section 1(F) above. Such work is to be paid under the applicable prevailing wage law for

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service or maintenance work;

6. Up to five percent (5%) of work performed by certified MWBE subcontractors on prime contracts that are valued at \$25,000,000 or more and for which participation goals are set forth in the contract and where such MWBE subcontractor is not signatory to any Schedule “A” agreement (“Exempt Work”). Exempt Work shall be no more than \$500,000 or 15% (whichever is greater) of the value of the subcontracts for work in any particular union’s jurisdiction under any prime contract; and

7. On-site work performed on purchased equipment, which is required by the manufacturer to be performed by its staff or by its selected contractors as a condition of the continued effectiveness of the equipment warranty.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement, Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to December 31, 2024, the expiration date of this Agreement. It is understood that this Agreement, together with all of its provisions, shall remain in effect for all such Program Work until completion, even if not completed by the expiration date of the Agreement. If Program Work otherwise falling within the scope of Article 3, Section 1 is not let for bid by the expiration date of this Agreement, this Agreement may be extended to that work by mutual agreement of the parties.

SECTION 3. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing Program Work:

A. Superintendents, supervisors (except field surveyors on construction contracts, general and forepersons specifically covered by a craft’s Schedule “A” agreement are included),

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engineers, professional engineers and/or licensed architects engaged in inspection and testing, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, technicians, non-manual employees, and all professional, engineering, administrative and management persons;

B. Employees of the Agency, New York City, or any other municipal or State agency, authority or entity, or employees of any other public employer, even though working on the project site while covered Program Work is underway;

C. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery, or involved in deliveries to and from the Program site, except to the extent they are lawfully included in the bargaining unit of a Schedule "A" agreement;

D. Employees of the Construction Manager (except that in the event the Agency engages a Contractor to serve as Construction Manager, then those employees of the Construction Manager performing manual, on site construction labor will be covered by this Agreement);

E. Employees engaged in on-site equipment warranty work including installation, repair or maintenance unless employees are already working on the site and are certified to perform warranty work;

F. Employees engaged in geophysical testing other than boring for core samples;

G. Employees engaged in laboratory, specialty testing, or inspections, pursuant to a professional services agreement between the Agency, or any of the Agency's other professional consultants, and such laboratory, testing, inspection or surveying firms;

H. Employees engaged in on-site maintenance of installed equipment or systems which maintenance is awarded as part of a contract that includes Program Work, but which maintenance

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occurs after installation of such equipment or system and is not directly related to construction services; and

I. Employees who perform work classified as Minor Repairs, and routine service and/or maintenance work.

SECTION 4. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to those parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor which do not perform Program Work. It is agreed that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Agency (including in its capacity as Construction Manager) or any Contractor. The Agreement shall further not apply to any New York City or other municipal or State agency, authority, or entity other than a listed Agency and nothing contained herein shall be construed to prohibit or restrict the Agency or its employees, or any State, New York City or other municipal or State authority, agency or entity and its employees, from performing on or off-site work related to Program Work.

As the contracts involving Program Work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the Agency (or Construction Manager) for performance under the terms of this Agreement.

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all employees who are performing on-site Program Work, with respect to that work.

SECTION 2. UNION REFERRAL

A. The Contractors agree to request, employ and hire craft employees, including Program Hires as defined in Article 2, Section 1(I), for Program Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area CBAs set forth in Schedule "A". Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; to determine the number of employees required; to select employees for layoff (subject to Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments. In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Program Work within its jurisdiction from any source other than referral by the Union. Any employee hired by a Contractor because a Local Union does not fill a request for qualified employees within a 48 hour period (Saturdays, Sundays and holidays excepted) are not covered by this Agreement for purposes of Article 11, Section 2, unless they are or become a member or agency shop fee payor of an affiliated Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Program Work ("Core Employees") and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and

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- (3) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award.

No more than twelve per centum (12%) of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above. Under this provision, name referrals begin with the eighth employee needed and continue on that same basis.

C. Notwithstanding Section 2(B), above, certified MWBE contractors for which participation goals are set forth in New York City Administrative Code §6-129, that are not signatory to any Schedule "A" CBAs, with subcontracts valued at or under two-million dollars (\$2,000,000), may request by name, and the Local will honor, referral of the second (2nd), fourth (4th), sixth (6th), and eighth (8th) Core Employee, who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor's active payroll for at least 60 out of the 365 calendar days prior to the contract award.

D. Where a certified MWBE Contractor voluntarily enters into a CBA with a BCTC Union, the employees of such Contractor at the time the CBA is executed shall be allowed to join the Union for the applicable trade subject to satisfying the Union's basic standards of proficiency for admission.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Council represents that each Local Union hiring hall and referral system will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such

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other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4. MINORITY, FEMALE, LOCAL AND SECTION 3 REFERRALS

In the event a Local Union either fails, or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

The Local Unions agree to prioritize the referral of Program Hires in accordance with Article 13 and to the extent consistent with the law, rules applicable to the union referral systems and joint apprentice programs. Those unions that do not currently provide for zip code preferences in their referral systems will undertake to implement such preferences consistent with this Agreement and their governing documents. Please see Exhibit "C" for a non-exhaustive list of eligible zip codes. Employees from these zip codes that are already on a contractor's workforce, including Core Employees, and referral of apprentices, in accordance with Article 13, Section 1(A) below, shall count towards the referral goals of this Section.

For any Program Work that may become subject to requirements under Section 3 of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992, and any rules, including new or revised rules, that may be published thereunder, the Local Unions acknowledge the Section 3 obligations of the Construction Manager or Contractor, as applicable, and agree to the zip code and NYCHA preferences described above to help implement this Article in a manner that would allow the Construction Manager or Contractor to meet its Section 3 obligations to the greatest extent feasible, and to post any required notices in

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the manner required by Section 3. The parties also acknowledge that the Construction Manager and Contractor may also fulfill its Section 3 requirements on Program Work by promoting opportunities for excluded employees, as defined by Article 3, Section 3 of this Agreement, on Program Work and, to the extent permitted by Section 3, by promoting opportunities for craft and other employees on non-Program Work.

SECTION 5. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 6. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule "A" CBA, and provided that all craft forepersons shall be experienced and qualified journeymen in their trade as determined by the appropriate Local Union. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor, except when an existing local CBA prohibits a foreperson from working when the craft persons, they are leading exceed a specified number.

SECTION 7. ON CALL REPAIR REFERRALS

A. When an Agency awards a contract under this Agreement that requires the Contractor to have employees available on short notice to make time-sensitive repairs with such contract requiring the Contractor to respond within as little as two hours from the time the Contractor is contacted by the Agency ("On Call, Repair Contract"), the Contractor will, within ten

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(10) days of being awarded an On Call, Repair Contract subject to this Agreement, notify the appropriate affiliated Union that would perform the work for a contractor that the Contractor has been awarded such a contract and immediately enter into good faith negotiations with such relevant affiliated Union to establish a procedure to receive time sensitive referrals from such affiliated Union(s).

B. In the event the Contractor and the relevant affiliated Union(s) are unable to negotiate a specific, mutually agreeable procedure for on call repair referral procedure within twenty (20) days of commencement of negotiations or prior to commencement of performance of the contract, whichever is earlier, the Contractor and the relevant affiliated Unions will follow the following procedure:

1. Upon notification by a Contractor that it has been awarded an On Call, Repair Contract pursuant to paragraph A above, each relevant affiliate Union shall provide the Contractor with the name and twenty-four (24) hour contact information of an On Call, Repair Contract contact person for urgent on call repair referrals.

2. The relevant affiliated Unions shall prepare a list of individuals eligible and prepared for referral on an immediate basis to respond to the on call repair contractor, which may include the affiliated Unions' service, repair and maintenance division workers where appropriate for repairs that can be made within 24 to 48 hours and paid at the appropriate prevailing wage rates for service and repair or maintenance work. Such list shall be provided to and in the possession of the designated-on call repair contact person for the affiliated Union and available for immediate reference.

3. Individuals on such list must be able to comply with the Contractor's response time pursuant to contract requirements.

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4. The Union's On Call, Repair Contract contact person shall respond to a contractor's request for referrals within a reasonable time of the request so that compliance with the contract shall be possible.

C. In the event that the Contractor makes a request for an on call referral that is compliant with this procedure and a Union is not able to respond to the request, that Union will be deemed to have waived the forty-eight (48) hour referral rule contained in Section 2 above and the Contractor may employ qualified applicants from any other available source that can meet contract requirements for that time-sensitive on call repair work only; provided, however, that any work related to the repair work that is not of a time sensitive nature under the contract shall comply with Section 2. If a Union fails to timely refer a worker and the Contractor employs other workers, the Contractor will e-mail the Agency within 72 hours and the Agency will forward that e-mail to the designated Labor Management Committee contacts.

ARTICLE 5 - UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Worksite during such time as bargaining unit work is occurring and subject to otherwise applicable policies pertaining to visitors to the site.

SECTION 2. STEWARDS

A. Each affiliated Union shall have the sole discretion to designate any journey person as a Steward and an alternate Steward. The Union shall notify the Owner and/or Construction Manager as well as the Contractor of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions

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and will receive the regular rate of pay for their craft classifications. All Stewards shall be working Stewards.

B. In addition to their work as an employee, the Steward shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's trade and, if applicable, subcontractors of their Contractor, but not with the employees of any other trade Contractor. No Contractor shall discriminate against the Steward in the proper performance of Union duties.

C. The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime except pursuant to a Schedule "A" CBA provision providing procedures for the equitable distribution of overtime.

SECTION 3. LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by a Schedule "A" provision, such provision shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required, except in cases of discipline or discharge for just cause. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

ARTICLE 6 - MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to, the right to: direct the work force, including determination as to the number of employees to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; require

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compliance with the directives of the Agency including standard restrictions related to security and access to the site that are equally applicable to Agency employees, guests, or vendors; or the discipline or discharge for just cause of its employees; assign and schedule work; promulgate reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work; and, the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, Agency and/or Construction Manager and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clauses, then such clause as set forth in Schedule "A" agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule "A" clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over

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such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor. There shall be no restrictions as to work which is performed off-site for Program Work.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other similar disruptive activity at the Program Work site for any reason by any Union or employee against any Contractor or employer. There shall be no other Union or concerted or employee activity which disrupts or interferes with the operation of the Program Work or the objectives of the Agency at any Program Work site. In addition, failure of any Union or employee to cross any picket line established by any Union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to a Program Work site where the failure to cross disrupts or interferes with the operation of Program Work is a violation of this Article. Should any employees breach this provision, the Unions will use their best efforts to try to immediately end that breach and return all employees to work. There shall be no lockout at a Program Work site by any signatory Contractor, Agency or Construction Manager.

SECTION 2. DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the Local Union involved advising of such fact, with copies of the notification to the Council. The Local

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Union shall instruct and order, the Council shall request, and each shall otherwise use their best efforts to cause, the employees (and where necessary the Council shall use its best efforts to cause the Local Union), to immediately cease and desist from any violation of this Article. If the Council complies with these obligations it shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council. Failure of a Contractor or the Construction Manager to give any notification set forth in this Article shall not excuse any violation of Section 1 of this Article.

SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity that may be brought).

A. A party invoking this procedure shall notify J.J. Pierson or Richard Adelman; who shall alternate (beginning with Arbitrator J.J. Pierson) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and Council.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the Construction Manager, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice required by Section 3, above.

C. All notices pursuant to this Article may be provided by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the Arbitrator, Contractor, Construction

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Manager and Local Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

D. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease and Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any). The Award shall be issued in writing within 3 hours after the close of the hearing and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

E. The Agency and Construction Manager (or such other designee of the Agency) may participate in full in all proceedings under this Article.

F. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved, and the Construction Manager.

G. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

H. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8 - LABOR MANAGEMENT COMMITTEE

SECTION 1. SUBJECTS

The Program Labor Management Committee (the “LMC”) will meet on a regular basis to:

- 1) promote harmonious relations among the Contractors and Unions;
- 2) enhance safety awareness, cost effectiveness and productivity of construction operations;
- 3) protect the public interests;
- 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations;
- and 5) review efforts to meet applicable participation goals for MWBEs and workforce participation goals for Program Hires, minority and female employees.

SECTION 2. COMPOSITION

The LMC shall be jointly chaired by a designee of the Agency and the President of the Council. It may include representatives of the Local Unions and Contractors involved in the issues being discussed. The parties shall mutually designate an MWBE representative to participate in appropriate Committee discussions. The Committee may conduct business through mutually agreed upon sub-committees.

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE
SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below, provided, in all cases, that the question, dispute or claim arose during the term of this Agreement. Grievances shall include the City contract number and the Program Work address; such information is posted at the work site if already commenced and is available in the City Record and Notice to Proceed for projects not already commenced.

Local Union grievances as to whether a scope of work is included or excluded from this Agreement shall be submitted to the LMC in the first instance rather than Step 1 below. To be timely, such notice must be given no later than five days prior to the bid opening date advertised in the City Record and bid documents for that contract, or any adjourned date publicly noticed if the grievance is challenging a determination by an Agency that the contract is not subject to this Agreement. Compliance with this limit shall operate as a statute of limitations and shall be a condition precedent to arbitration. For other grievances as to contractor and/or subcontractor scope of work issues, notice of such challenges shall be submitted to the LMC within 7 calendar days after the act, occurrence or event giving rise to the grievance. If the scope of work grievance is not resolved within 21 days of its submission to the LMC, then the grievance may proceed directly to Step 3 below.

Step 1:

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business representative or job steward give notice of the claimed violation to the work site representative of the involved

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Contractor and the Construction Manager. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Construction Manager (or designee) as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

A Step 2 grievance shall be filed with the Agency, the BCTC, the Contractor, and, if the grievance is against a subcontractor, the subcontractor. The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor and/or a contractor association representative where appropriate, Council, the Construction Manager (or designee), and, if the grievance is against a subcontractor, the subcontractor, shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement. The BCTC shall schedule the Step 2 meeting.

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Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to the BCTC. In the event the matter is not resolved at Step 2, either J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure, shall be designated at the Step 2 hearing and the BCTC will notify the arbitrator of his designation. After such notification by the BCTC, the local demanding arbitration shall within a reasonable time request the arbitrator to schedule the matter for an arbitration hearing date. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the Construction Manager (or designee), involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award, with the exception of those related to compliance with requirements to pay prevailing wages and supplements in accordance with federal or State law, may

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provide retroactivity of any kind exceeding 60 calendar days prior to the date of service of the written grievance on the Construction Manager and the involved Contractor or Local Union.

SECTION 3. PARTICIPATION BY AGENCY AND/OR CONSTRUCTION MANAGER

The Agency and Construction Manager (or such other designee of the Agency) shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 1. NO DISRUPTIONS

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 2. ASSIGNMENT

All Program Work assignments shall be made by the Contractor to unions affiliated with the BCTC consistent with the New York Plan for the Settlement of Jurisdictional Disputes ("New York Plan") and its Greenbook decisions, if any. Where there are no applicable Greenbook decisions, assignments shall be made in accordance with the provisions of the New York Plan and local industry practice.

SECTION 3. NO INTERFERENCE WITH WORK

There shall be no interference or interruption of any kind with the Program Work while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the hourly wage rates applicable for those classifications as required by the applicable prevailing wage laws.

SECTION 2. EMPLOYEE BENEFITS

A. The Contractors agree to pay on a timely basis contributions on behalf of all employees covered by this Agreement to those established jointly trustee employee benefit funds designated in the applicable CBA in Schedule "A" (in the appropriate Schedule "A" amounts), provided that such benefits are required to be paid on public works under any applicable prevailing wage law. Bona fide jointly trustee fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if similarly required under applicable prevailing wage law. Contractors, not otherwise contractually bound to do so, shall not be required to contribute to benefits, trusts or plans of any kind which are not required by the prevailing wage law provided, however, that this provision does not relieve Contractors signatory to local collective bargaining agreement with any affiliated union from complying with the fringe benefit requirements for all funds contained in the CBA. Furthermore, employees that may remain unaffiliated with any local union at the completion of their employment under the terms of this Agreement may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds that they have participated in under the terms of this Agreement.

B. 1. Notwithstanding Section 2 (A) above, and subject to 2 (B)(2) below, Contractors who designate Core Employees pursuant to Article 4, Section 2 (B) and (C) that are not signatory to a Schedule "A" agreement and who maintain bona fide private benefit plans that

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satisfy the requirements of Section 220 of the New York State Labor Law, may satisfy the above benefit obligation with respect to those employees by providing those employees with coverage under their private benefit plans (to the extent consistent with Section 220). The total benefit payments to be made on behalf of each such employee must be equal to the total Section 220 supplement amount and any shortfall must be paid by cash supplement to the employee.

2. A contractor that will satisfy its Section 220 obligations in accordance with subsection 2(B)(1) above shall make available to the Agency at the time of contract award a complete set of plan documents for each non-Schedule “A” benefit plan into which contributions will be made and/or coverage provided pursuant to the provisions of Section 2(B)(1) above. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Section 220.

3. The City shall verify that the alternate benefit plan(s), together with any cash supplement to the employee, is compliant with Section 220 prior to awarding the Contractor a contract covered by this Agreement. In the event the Contractor’s alternate benefit plan(s), together with any cash supplement to the employee, is determined to be compliant with Section 220 and will be utilized by the Contractor on behalf of Article 4, Section 2(B) and (C) Core Employees, the Local Unions have no duty to enforce the Contractor’s obligations on the alternate benefit plan(s) as they are not party to the alternate plan(s) or privy to the terms and conditions of the plan obligations. In the event the City determines the alternate benefit plan(s), together with any cash supplement to the employee, is not compliant with Section 220, the Contractor may, upon executing a Letter of Assent, satisfy its obligations for all employees, including Core Employees, by contributing to the Schedule “A” benefit plans in accordance with the terms of the Schedule “A” agreements.

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C. The Contractors agree to be bound by the written terms of the legally established jointly trustee Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement requires such benefit payments.

D. 1. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at www.nyc.gov/ppb, §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee

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benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

2. In addition, where a union or employee benefit fund gives notice to the City that a Contractor is Delinquent as defined in subsection 2(D)(1) above and the City determines that the notice includes appropriate back-up documentation that the Contractor is delinquent, the City will promptly, but not later than twenty (20) days after receipt of the notice, provide a copy of said notice to City Agencies. In the event the City determines there is insufficient back-up documentation, it will notify the appropriate union and/or fringe benefit fund promptly, but not later than twenty (20) days after receipt of the Delinquency Notice, and shall include notice of what additional documentation is requested. Any determination by the City that there is insufficient back-up must be reasonable. This provision is intended to enhance compliance with the prevailing wage law and this Agreement with respect to the payment of fringe benefits and is not intended as a substitute for the resolution of a disputed claim pursuant to any applicable law or agreement.

The City and the relevant Agency(s) will thereafter require the Delinquent Contractor to provide cancelled checks or other equivalent proof of payment of benefit contributions that have come due, to be submitted with certified payroll reports for all Program Work covered by this Agreement on which the Delinquent Contractor is engaged, for at least a one-year period or such earlier period if the Contractor is ultimately determined not to be a Delinquent Contractor. Such proof of payment when required is a condition of payment of the Delinquent Contractor's invoices by any entity, including, but not limited to, the City, the relevant Agency(s), Construction Manager, General Contractor, the prime or higher level subcontractor, as is appropriate under the Delinquent

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Contractor's engagement. The union and the funds shall upon request receive copies of the certified payrolls, cancelled checks, or other proof of payment from the City and/or the relevant Agency(s).

E. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor that the union and/or fringe benefit fund claims to be due it, pending resolution of the dispute pursuant to the union's Schedule "A" agreement, and the amount shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or employee benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

F. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on the part of

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the Agency to pay any union or fringe benefit fund, nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the union/fund and/or fringe benefit and the Agency.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS, SHIFTS AND HOLIDAYS **SECTION 1. WORK WEEK AND WORKDAY**

A. The standard work week shall consist of 40 hours of work at straight time rates, Monday through Friday, 8 hours per day, plus ½ hour unpaid lunch period.

B. In accordance with project needs, there shall be flexible start times with advance notice from Contractor to the Union. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m., for an 8-hour day. The Evening Shift shall commence between the hours of 3:00 p.m. and 6:00 p.m., unless different times are necessitated by the Agency's phasing plans on specific projects. The Night Shift shall commence between the hours of 11:00 p.m. and 2:00 a.m., unless different times are necessitated by the Agency's phasing plans on specific projects. Subject to the foregoing, starting and quitting times shall occur at the Program Work site designated by the Contractor.

C. Scheduling - Except as provided above, Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch.

D. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime shall be paid for any work over eight (8) hours in a day and any work over forty (40) hours in a week. Overtime shall be paid at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable

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Schedule "A". There shall be no stacking or pyramiding of overtime pay under any circumstances. There will be no restriction upon the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who shall be worked, including the use of employees, other than those who have worked the regular or scheduled work week, at straight time rates. The Contractor shall have the right to schedule work so as to minimize overtime or schedule overtime as to some, but not all, of the crafts and whether or not of a continuous nature.

SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Program Work schedules and existing Program Work conditions including the minimization of interference with the mission of the Agency. It is not necessary to work a day shift in order to schedule a second or third shift, or a second shift in order to schedule a third shift, or to schedule all of the crafts when only certain crafts or employees are needed. Shifts must have prior approval of the Agency or Construction Manager and must be scheduled with not less than five workdays' notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 10 p.m. and 2 a.m., subject to different times necessitated by the Agency phasing plans on specific projects. There shall be no reduction in shift hour work. All employees within the same classification performing Program Work will be paid at the same wage rate regardless of the shift or work, subject only to the foregoing provisions.

C. Flexible Starting Times - Shift starting times will be adjusted by the Contractor as necessary to fulfill Program Work requirements subject to the notice requirements of paragraph A.

SECTION 4. HOLIDAYS

A. Schedule - There shall be nine (9) recognized holidays on the project:

- | | |
|------------------------|------------------|
| New Year's Day | |
| Martin Luther King Day | President's Day |
| Memorial Day | Veteran's Day |
| Labor Day | Thanksgiving Day |
| Independence Day | Christmas Day |

All said holidays shall be observed on the calendar date except those holidays which occur on Saturday shall be observed on the previous Friday and those that occur on Sunday shall be observed on the following Monday.

B. Payment - Regular holiday pay, if any, for work performed on such a PLA recognized holiday shall be in accordance with the applicable Schedule "A" for work performed on a holiday, even where the PLA holiday differs from the CBA holidays.

C. Exclusivity - No holidays other than those listed in Section 4(A) above shall be recognized or observed.

SECTION 5. SATURDAY WORK

The Contractor may schedule a Saturday workday and such time shall be scheduled and paid at time and one-half (1½) unless the applicable Schedule "A" permits a straight time rate.

SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to their regular schedule and who are not provided with work shall be paid two hours reporting pay at straight time rates. An employee whose work is terminated early by a Contractor due to severe weather, power failure, fire

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or natural disaster or for similar circumstances beyond the Contractor's control, shall receive pay only for such time as is actually worked. In other instances, in which an employee's work is terminated early (unless provided otherwise elsewhere in this Agreement), the employee shall be paid for their full shift. Contractors shall not be permitted to call, text or email or voicemail employees in advance of their regularly scheduled shift starting time to avoid reporting pay. Notwithstanding the above, in the event that the National Weather Service issues a weather advisory for the area in which the work location is situated, and the entire project is shut down as a result of the Weather Advisory, the Contractor shall be permitted to speak to employees no less than four (4) hours in advance of their shift starting time, unless the Local Union consents to a shorter notice in writing, to advise them not to report to work due to the National Weather Service advisory, and employees who are so notified shall not receive two (2) hours reporting pay if they report to the work location. The Contractor shall make every effort to notify each employee directly and confirm that notification has been received. Voice, text, and email messages left for employees without confirmation of delivery and receipt by employee do not constitute sufficient notice under this provision.

B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.

C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

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D. Except as specifically set forth in this Article there shall be no premiums, bonuses, hazardous duty, high time or other special premium payments or reduction in shift hours of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Schedule "A" requires a full weeks' pay for forepersons.

SECTION 7. PAYMENT OF WAGES

A. Termination - Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of lay off or discharge.

SECTION 8. EMERGENCY WORK SUSPENSION

A Contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Program Work. In such instances, employees will be paid for actual time worked, except that when a Contractor requests that employees remain at the job site available for work, employees will be paid for that time at their hourly rate of pay.

SECTION 9. INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than 8 hours wages for that day. Further, the employee shall be rehired at such time as able to return to duties provided there is still Program Work available for which the employee is qualified and able to perform.

SECTION 10. TIME KEEPING

A Contractor may utilize systems to check employees in and out. Each employee must check in and out and sign a daily sign-in sheet, or other attendance methodology approved in writing by

the Agency(s). The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

SECTION 11. MEAL PERIOD

A Contractor shall schedule an unpaid period of not more than 1/2-hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts, or which provides for staggered lunch periods within a craft or trade. If an employee is required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule "A".

SECTION 12. BREAK PERIODS

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location.

ARTICLE 13 - APPRENTICES AND WORKFORCE DEVELOPMENT

SECTION 1. APPRENTICE RATIOS AND REFERRALS

A. Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications in the maximum ratio permitted by the New York State Department of Labor ("NYSDOL") or the maximum allowed per trade. Apprentices and such other classifications as are appropriate shall be employed in a manner

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consistent with the provisions of the appropriate Schedule “A” agreement. The parties encourage, as an appropriate source of apprentice recruitment consistent with the rules and operations of the affiliated unions’ apprentice-programs, the use of the Edward J. Malloy Initiative for Construction Skills, Non-Traditional Employment for Women, New York Helmets to Hardhats, and Pathways to Apprenticeship (P2A). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.

SECTION 2. WORKFORCE DEVELOPMENT

A. The parties to this Agreement recognize the mutual interest in increasing training and career opportunities for Program Hires. The parties are committed to (i) increasing opportunities for Program Hires in these zip codes in pre-apprenticeship and apprenticeship programs, and (ii) using the work opportunities provided by this Agreement to increase the career opportunities for qualified Program Hires, and (iii) to assure the continued availability of a skilled and qualified, readily available construction workforce for this program and future work. The parties agree to the Workforce Development Program set forth in Exhibit “D”.

B. Specifically, the parties have established an initiative entitled HireNYC Construction Careers, which is an initiative to advance career opportunities for Program Hires.

C. The HireNYC Construction Careers initiative will work with the Mayor’s Office of Workforce Development (“WKDEV”) and its Workforce1 Centers to recruit Program Hires interested in employment in the construction industry.

D. HireNYC Construction Careers intends to capitalize on the work opportunities presented by this Agreement to create a pathway to career opportunities in the construction workforce. To this end the HireNYC Construction Careers initiative includes a workforce goal of at least 30% of all hours worked under this Agreement, including by subcontractors pursuant

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to Article 3, Section 1(B)(6), to be worked by workers residing within the specified zip codes or NYCHA housing. In order to encourage recruitment of new workers, HireNYC Construction Careers has established a goal that at least 30% of all of those hours are to be worked by apprentices from those zip codes or NYCHA housing.

E. The Contractors and Unions agree to cooperate and participate in the implementation of HireNYC Construction Careers to assist Program Hires with educational and training opportunities related to access to pre-apprenticeship, apprenticeship, and project work as set forth in this Agreement.

F. Reporting Requirements:

i. The Contractors shall report the residence zip code information on all certified payroll reports.

ii. The Local Unions, their referral systems, the affiliated pre-apprentice programs, and Contractors shall cooperate with any protocol developed for monitoring the HireNYC Construction Careers initiative.

iii. The Local Unions shall provide the WKDEV copies of the following reports when such reports are submitted to NYSDOL: *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)*, *Apprentice Training Program Affirmative Action Plan (AT 603)*, *Apprenticeship Agreement (AT 401)*, or such alternate reporting system as the parties may negotiate during the term of this Agreement.

G. The City and BCTC agree that no less than annually, the LMC shall review the implementation of HireNYC Construction Careers, as well as Program Hire opportunities afforded as a result of the initiative. The City and BCTC will collaborate to develop monitoring

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protocol for the purpose of measuring the success of HireNYC Construction Careers. The City and BCTC may, on mutual consent, modify the goals, procedures and protocols, as necessary to afford continued opportunity to Program Hires.

H. To facilitate the commitments set forth in this Agreement, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with WKDEV to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

ARTICLE 14 - SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 1. SAFETY REQUIREMENTS

Each Contractor will ensure that applicable OSHA and safety requirements are at all times maintained on the Program Work site and the employees and Unions agree to cooperate fully with these efforts to the extent consistent with their rights and obligations under the law. Employees will cooperate with employer safety policies and will perform their work at all times in a safe manner and protect themselves and the property of the Contractor and Agency from injury or harm, to the extent consistent with their rights and obligations under the law. Failure to do so will be grounds for discipline, including discharge. The Construction Manager and/or Contractor may adopt, and the Unions shall agree to, the Drug and Alcohol Testing Policy attached as Schedule "B".

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the Construction Manager for Program Work. Such rules will be published and posted in conspicuous places throughout the Program Work sites. Any site security and access policies established by the Construction Manager or General Contractor intended for specific application to the construction workforce for Program

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Work and that are not established pursuant to an Agency directive shall be implemented only after notice to the BCTC and its affiliates and an opportunity for negotiation and resolution by the Labor Management Committee.

SECTION 3. INSPECTIONS

The Contractors and Construction Manager retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15 - TEMPORARY SERVICES

SECTION 1.

Temporary services, i.e. all temporary heat, climate control, water, power and light, shall only be required upon the determination of the Agency or Construction Manager, and when used shall be staffed and assigned to the appropriate trade(s) with jurisdiction. Temporary services shall be provided by the appropriate Contractors' existing employees during working hours in which a shift is scheduled for employees of the Contractor. The Agency or Construction Manager may determine the need for temporary services requirements during non-working hours, and when used shall be staffed and assigned to the appropriate trades(s), and which may be limited to one person per applicable trade where practicable. There shall be no stacking of trades on temporary services, provided this does not constitute a waiver of primary trade jurisdiction. In the event a temporary system component is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

ARTICLE 16 - NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national

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origin, marital status, citizenship status, disability, gender identity, age or any other status provided by law, in any manner prohibited by law or regulation.

SECTION 2. LANGUAGE OF AGREEMENT

Any words signifying any gender shall be interpreted to mean any or all gender identities.

ARTICLE 17 - GENERAL TERMS

SECTION 1. PROJECT RULES

A. The Construction Manager and the Contractors shall establish such reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work. These rules will be explained at the pre-job conference and posted at the Program Work sites and may be amended thereafter as necessary. Notice of amendments will be provided to the appropriate Local Union. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is for cause.

B. The parties adopt and incorporate the BCTC's Standards of Excellence as annexed hereto as Exhibit "B".

SECTION 2. TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement.

SECTION 5. FULL WORKDAY

Employees shall be at their work area at the starting time established by the Contractor, provided they are provided access to the work area. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION AND WAIVER

The Construction Manager, Contractors and the Unions will cooperate in seeking any NYSDOL, or any other government, approvals that may be needed for implementation of any terms of this Agreement. In addition, the Council, on their own behalf and on behalf of its participating affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding contrary provisions of any applicable prevailing wage, or other, law and intend this Agreement to constitute a waiver of any such prevailing wage, or other, law to the greatest extent permissible only for work within the scope of this Agreement, including specifically, but not limited to those provisions relating to shift, night, and similar differentials and premiums. This Agreement does not, however, constitute a waiver or modification of the prevailing wage schedules applicable to work not covered by this Agreement.

ARTICLE 18 - SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or if such application may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, the provision or provisions involved (and/or its application to

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particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law (and to the extent no funding or exemption is lost), unless the part or parts so found to be in violation of law or to cause such loss are wholly inseparable from the remaining portions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to trigger the foregoing, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the Agency's (or Construction Manager's) bid specifications, or other action, requiring that a successful bidder (and subcontractor) become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, such requirement (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the Agreement shall remain in full force and effect to the extent allowed by law and to the extent no funding or exemption is lost. In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction only where the Agency and Contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court or other action taken and the intent of the parties for contracts to be let in the future.

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Agency, the Construction Manager, any Contractor, nor any Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order or injunction, other determination, or in order to maintain funding or a New York State Labor Law exemption for Program Work. Bid specifications will be issued in conformance with court orders then in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

ARTICLE 19 - FUTURE CHANGES IN SCHEDULE "A" AREA CONTRACTS

SECTION 1. CHANGES TO AREA CONTRACTS

A. Schedule "A" to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the Area CBAs that are the basis for the Schedule "A" notify the Mayor's Office of Contract Services ("MOCS"), Agency and Construction Manager in writing by providing a copy of the updated CBA(s) incorporating the changes agreed to in that Area CBA which are applicable to work covered by this Agreement and their effective dates.

B. It is agreed that any provisions negotiated into Schedule "A" CBAs will not apply to work under this Agreement if such provisions are less favorable to those uniformly required of contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on Program Work if it may be construed to apply exclusively, or predominantly, to work covered by this Agreement.

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule "A" of provisions agreed upon in the renegotiation of Area CBAs shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Program Work by any Local Union involved in the renegotiation of Area Local CBAs nor shall there be any lock-out on such Program Work affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS' COMPENSATION ADR

SECTION 1.

An Alternative Dispute Resolution ("ADR") program may be negotiated and participation in the ADR program will be optional by trade.

ARTICLE 21 - HELMETS TO HARDHATS

SECTION 1.

The Contractors and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the New York City Helmets to Hardhats Program ("H2H") to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

SECTION 2.

The Unions and Contractors agree to coordinate with H2H to create and maintain an integrated database of veterans interested in working on this project and of apprenticeship and

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

employment opportunities for this project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

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2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective as

of the ___ day of _____, _____.

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL
OF GREATER NEW YORK AND VICINITY

BY: *Gary La Barbera*
Gary LaBarbera
President

FOR NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

BY: *Lorraine Grillo*
Lorraine Grillo
Commissioner

APPROVED AS TO FORM:

Steve Stein Cushman
ACTING CORPORATION COUNSEL
NEW YORK CITY

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LIST OF SIGNATORY UNIONS
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No.5
Bricklayers and Allied Craftworkers, Local Union No. 1
Building Concrete & Excavating Laborers, Local Union No. 731
N.Y.C. and Vicinity District Council of Carpenters
Cement Masons, Local Union No. 780
Concrete Workers District Council No. 16
Asbestos, Lead & Hazardous Waste, Laborers Local Union No. 78
Construction & General Building Laborers Local Union No. 79
Derrickmen and Riggers Local Union No. 197
International Brotherhood of Electrical Workers, Local Union No. 3
International Union of Elevator Constructors, Local Union No. 1
Heat & Frost Insulators & Allied Workers, Local Union No. 12
Heat & Frost Insulators & Allied Workers, Local Union No. 12A
Pavers & Road Builders, Laborers Local Union No. 1010
New York State Iron Workers District Council
Structural Iron Workers, Local Union No. 40
Structural Iron Workers, Local Union No. 361
Mason Tenders District Council
Metallic Lathers & Reinforcing Ironworkers, Local No. 46
Ornamental Iron Workers, Local Union No. 580
Glaziers No. 1087, District Council 9
Painters, District Council No. 9
Metal Polishers, Local Union No. 8A-28A; District Council No. 9
Drywall Tapers Local Union No 1974, District Council 9
Bridge & Structural Steel Painters, Local Union No. 806, District Council 9
Operative Plasterers Local Union No. 262
UA Plumbers Local Union No. 1
Private Sanitation, Teamsters Local Union No. 813
Roofers & Waterproofers, Local Union No. 8
Sheet Metal Workers, Local Union No. 28
Sheet Metal Workers, Local Union No. 137
UA Steamfitters, Local Union No. 638
Teamsters, Local Union No. 282
Tile, Marble & Terrazzo, B.A.C. Local Union No. 7

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SCHEDULE "A" - CBAs

Union	Current Agreement w/
Architectural and Ornamental Iron Workers Local Union 580, AFL-CIO	Allied Building Metal Industries, Inc.
Building, Concrete, Excavating & Common Laborers Local 731	Independent
Building, Concrete, Excavating & Common Laborers Local 731	Members of the General Contractors Association of New York, Inc.
Bricklayers Local 1 of the International Union of Bricklayers and Allied Craftworkers	Independent
District Council No. 9, I.U.P.A.T Glaziers Local 1087	Window and Plate Glass Dealers Association
Drywall Tapers and Painters Local 1974, affiliated with International Union of Painters & Allied Trades and Drywall Taping Contractor's Association & Association of Wall-Ceiling & Carpentry Industries NY, Inc.	Independent
Enterprise Association of Steamfitters and Apprentices Local 638	Mechanical Contractors Association of NY, Inc.
Enterprise Association of Steamfitters and Apprentices Local 638	Independent
Elevator Constructors Local 1 of NY and NJ	ThyssenKrupp Elevator Corporation
Elevator Constructors Local 1 of NY and NJ	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Member of the General Contractors Association of New York, Inc.
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	Independent
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	The Insulation Contractors Association of New York City, Inc.

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International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Independent
International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Environmental Contractors Association, Inc.
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No. 5	Boilermakers Association of Greater New York
Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO	New York Electrical Contractors Association
International Brotherhood of Teamsters, Local 282, High Rise Contract	Building Contractors Association & Independents
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Cement League
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Independent
Local 8 Roofers, Waterproofers & Allied Workers	Roofing and Waterproofing Contractors Association of New York and Vicinity
Local Union 1 of the United Association of Journeymen and Apprentices of the Pipe Fitting Industry of the United States and Canada	Association of Contracting Plumbers of the City of New York
Local Union Number 40 & 361 of Bridge, Structural Ornamental and Reinforcing Iron Workers AFL-CIO	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Building Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Interior Demolition Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	NYCDCA

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Mason Tenders DC & Laborers' International Union – Local 78 & 79	Environmental Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	ABMC
Operative Plasterers' and Cement Masons' International Association Local No. 262	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	The Association of Master Painters & Decorators of NY, Inc. and The Association of Wall, Ceiling & Carpentry Industries of NY, Inc. and The Window and Plate Glass Dealers Association
Sheet Metal Workers' International Association, Local 28	Sheet Metal & Air Conditioning Contractors Association of New York City, Inc.
Sheet Metal Workers' International Association, Local 137	The Greater New York Sign Association
Structural Steel and Bridge Painters Local 806, DC 9 International Union of Painters and Allied Trades, AFL-CIO	New York Structural Steel Painting Contractors Association
Teamsters Local 813	Independent
Teamsters Local 813	IESI NY Corporation
The Cement Masons' Union, Local 780	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local No. 1556	Concrete Contractors of NY

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The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Millwright Local 740	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Manufacturing Woodworkers Association of Greater New York Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Hoisting Trade Association of New York, Inc.
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Test Boring Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	Building Contractors Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Association of Wall-Ceiling & Carpentry Industries of New York, Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	The Cement League
The District Council of NYC and Vicinity of the United Brotherhood of Carpenters and Joiners of America	New York City Millwright Association

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The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	Greater New York Floor Covering Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Association of Architectural Metal & Glass
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Building Construction Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Local 2287	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Shop Carpenters	Independent
The Tile Setters and Tile Finishers Union of New York and New Jersey, Local 7 of the International Bricklayers and Allied Craftworkers	The Greater New York and New Jersey Contractors Association
United Derrickmen & Riggers Association, Local 197 of NY, LI, Westchester & Vicinity	Contracting Stonesetters Association Inc.
United Derrickmen & Riggers Association Local 197 of NY, LI, Westchester and Vicinity	Building Stone and Pre-cast Contractors Association

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

Exhibit A

Project Labor Agreement - Letter of Assent

Dear: _____

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as the NYC Agency Renovation and located at _____ (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto;
- (2) Agrees to be bound by the legally established collective bargaining agreements; local trust agreements for employee benefit funds; and trust documents for joint apprentice programs as well as apprentice program rules and procedures but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Provide description of the Work, identify craft jurisdiction(s) and all contract numbers below:

Local Union: _____

Description of Work: _____

Contract Number(s): _____

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

Dated: _____

(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

(Authorized Officer & Title)

(Address)

(Signature)

(Phone) (Fax)

Contractor's State License

Sworn to before me this
____ day of _____,

Notary Public

Exhibit B

**NEW YORK CITY BUILDING AND CONSTRUCTION TRADES COUNCIL
STANDARDS OF EXCELLENCE**

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank and file members represented by the affiliated local unions acknowledge and adopt the following standards:

- *Provide a full day's work for a full days pay;*
- *Safely work towards the timely completion of the job;*
- *Arrive to work on time and work until the contractual quitting time;*
- *Adhere to contractual lunch and break times;*
- *Promote a drug and alcohol-free work site;*
- *Work in accordance with all applicable safety rules and procedures;*
- *Allow union representatives to handle job site disputes and grievances without resort to slowdowns, or unlawful job disruptions;*
- *Respect management directives that are safe, reasonable and legitimate;*
- *Respect the rights of co-workers;*
- *Respect the property rights of the owner, management and contractors.*

The Unions affiliated with the New York City Building and Construction Trades Council will expect the signatory contractors to safely and efficiently manage their jobs and the unions see this as a corresponding obligation of the contractors under this Standard of Excellence. The affiliated unions will expect the following from its signatory contractors:

- *Management adherence to the collective bargaining agreements;*
- *Communication and cooperation with the trade foremen and stewards;*
- *Efficient, safe and sanitary management of the job site;*
- *Efficient job scheduling to mitigate and minimize unproductive time;*
- *Efficient and adequate staffing by properly trained employees by trade;*
- *Efficient delivery schedules and availability of equipment and tools to ensure efficient job progress;*
- *Ensure proper blueprints, specifications and layout instructions and material are available in a timely manner*
- *Promote job site dispute resolution and leadership skills to mitigate such disputes;*
- *Treatment of all employees in a respectful and dignified manner acknowledging their contributions to a successful project.*

The affiliated unions and their signatory contractors shall ensure that both the rank and file members and the management staff shall be properly trained in the obligations undertaken in the Standard of Excellence.

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

Exhibit “C” - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
(Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
10001	Manhattan	Midtown South
10002	Manhattan	Chinatown
10009	Manhattan	East Village
10025	Manhattan	Manhattan Valley
10026	Manhattan	Central Harlem
10027	Manhattan	Manhattanville
10029	Manhattan	East Harlem
10030	Manhattan	Central Harlem
10031	Manhattan	Hamilton Heights
10032	Manhattan	Inwood and Washington Heights
10033	Manhattan	Washington Heights
10034	Manhattan	Inwood
10035	Manhattan	East Harlem
10037	Manhattan	Central Harlem
10038	Manhattan	Lower Manhattan
10039	Manhattan	Central Harlem
10040	Manhattan	Inwood and Washington Heights
10301	Staten Island	St. George
10302	Staten Island	Port Richmond
10303	Staten Island	Mariner's Harbor
10304	Staten Island	Stapleton
10310	Staten Island	West Brighton
10451	Bronx	Concourse Village
10452	Bronx	High Bridge
10453	Bronx	University Heights
10454	Bronx	Mott Haven
10455	Bronx	Longwood
10456	Bronx	Melrose
10457	Bronx	Central Bronx
10458	Bronx	Bedford Park
10459	Bronx	Morrisania
10460	Bronx	East Tremont
10462	Bronx	Parkchester
10463	Bronx	Kingsbridge
10466	Bronx	Wakefield
10467	Bronx	Norwood
10468	Bronx	Bronx Park and Fordham
10472	Bronx	Unionport
10473	Bronx	Soundview
10474	Bronx	Hunts Point

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
11101	Queens	Long Island City
11102	Queens	Northwest Queens
11106	Queens	Ravenswood
11203	Brooklyn	East Flatbush
11204	Brooklyn	Borough Park
11205	Brooklyn	Fort Greene
11206	Brooklyn	East Williamsburg
11207	Brooklyn	East New York
11208	Brooklyn	East New York / Cypress Hills
11211	Brooklyn	Williamsburg
11212	Brooklyn	Brownsville
11213	Brooklyn	Crown Heights
11214	Brooklyn	Bensonhurst
11216	Brooklyn	Central Brooklyn
11218	Brooklyn	Kensington
11219	Brooklyn	Borough Park
11220	Brooklyn	Sunset Park
11221	Brooklyn	Bushwick
11223	Brooklyn	Gravesend
11224	Brooklyn	Coney Island
11225	Brooklyn	Prospect Lefferts Gardens
11226	Brooklyn	Prospect Park South
11230	Brooklyn	Midwood
11232	Brooklyn	Sunset Park
11233	Brooklyn	Ocean Hill
11235	Brooklyn	Brighton Beach
11237	Brooklyn	Bushwick and Williamsburg
11239	Brooklyn	Starrett City
11354	Queens	Downtown Flushing
11355	Queens	Queensboro Hill
11368	Queens	South Corona
11369	Queens	East Elmhurst
11373	Queens	Elmhurst
11416	Queens	Southwest Queens
11417	Queens	Ozone Park
11418	Queens	Richmond Hill
11430	Queens	Ozone Park
11432	Queens	Jamaica Center
11433	Queens	South Jamaica
11435	Queens	Briarwood
11691	Queens	Far Rockaway
11692	Queens	Arverne

Data Source: 2013-2017 American Community Survey 5-year estimates

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
06401	CT	Ansonia
06510	CT	New Haven
06511	CT	New Haven
06513	CT	New Haven
06515	CT	New Haven
06519	CT	New Haven
06604	CT	Bridgeport
06605	CT	Bridgeport
06607	CT	Bridgeport
06608	CT	Bridgeport
06610	CT	Bridgeport
06702	CT	Waterbury
06704	CT	Waterbury
06705	CT	Waterbury
06706	CT	Waterbury
06708	CT	Waterbury
06710	CT	Waterbury
06810	CT	Danbury
07002	NJ	Bayonne
07017	NJ	East Orange
07018	NJ	East Orange
07022	NJ	Fairview
07026	NJ	Garfield
07029	NJ	Harrison
07047	NJ	North Bergen
07050	NJ	Orange
07055	NJ	Passaic
07060	NJ	Plainfield
07062	NJ	Plainfield
07087	NJ	Union City
07093	NJ	West New York
07102	NJ	Newark
07103	NJ	Newark
07104	NJ	Newark
07105	NJ	Newark
07106	NJ	Newark
07107	NJ	Newark
07108	NJ	Newark
07111	NJ	Irvington
07112	NJ	Newark
07114	NJ	Newark
07201	NJ	Elizabeth
07202	NJ	Elizabeth
07206	NJ	Elizabethport
07208	NJ	Elizabeth
07304	NJ	Jersey City
07305	NJ	Jersey City
07306	NJ	Jersey City
07307	NJ	Jersey City
07310	NJ	Jersey City

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PLA Exhibit C - HireNYC Construction Careers

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Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
07501	NJ	Paterson
07502	NJ	Paterson
07503	NJ	Paterson
07504	NJ	Paterson
07505	NJ	Paterson
07513	NJ	Paterson
07514	NJ	Paterson
07522	NJ	Paterson
07524	NJ	Paterson
07608	NJ	Teterboro
07703	NJ	Fort Monmouth
07712	NJ	Asbury Park
07727	NJ	Farmingdale
07734	NJ	Keansburg
07740	NJ	Long Branch
07820	NJ	Allamuchy
07939	NJ	Lyons
08031	NJ	Bellmawr
08045	NJ	Lawnside
08095	NJ	Winslow
08102	NJ	Camden
08103	NJ	Camden
08104	NJ	Camden
08105	NJ	Camden
08110	NJ	Pennsauken
08217	NJ	Elwood
08224	NJ	New Gretna
08608	NJ	Trenton
08609	NJ	Trenton
08611	NJ	Trenton
08618	NJ	Trenton
08638	NJ	Trenton
08701	NJ	Lakewood
08751	NJ	Seaside Heights
08808	NJ	Broadway
08861	NJ	Perth Amboy
08901	NJ	New Brunswick
10545	NY	Maryknoll
10550	NY	Mount Vernon
10601	NY	White Plains
10701	NY	Yonkers
10703	NY	Yonkers
10705	NY	Yonkers
10801	NY	New Rochelle
10927	NY	Haverstraw
10932	NY	Howells
10940	NY	Middletown
10950	NY	Monroe
10952	NY	Monsey
10963	NY	Otisville
10977	NY	Spring Valley

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
11096	NY	Inwood
11550	NY	Hempstead
11556	NY	Uniondale
11713	NY	Bellport
11798	NY	Wyandanch
11951	NY	Mastic Beach
11970	NY	South Jamesport
12401	NY	Kingston
12416	NY	Chichester
12419	NY	Cottkill
12427	NY	Elka Park
12428	NY	Ellenville
12432	NY	Glasco
12457	NY	Mount Tremper
12475	NY	Ruby
12489	NY	Wawarsing
12490	NY	West Camp
12491	NY	West Hurley
12516	NY	Copake
12550	NY	Newburgh
12561	NY	New Paltz
12583	NY	Tivoli
12589	NY	Wallkill
12594	NY	Wingdale
12601	NY	Poughkeepsie
12701	NY	Monticello
12725	NY	Claryville
12729	NY	Cuddebackville
12732	NY	Eldred
12733	NY	Fallsburg
12743	NY	Highland Lake
12747	NY	Hurleyville
12749	NY	Kauneonga Lake
12751	NY	Kiamesha Lake
12754	NY	Liberty
12758	NY	Livingston Manor
12759	NY	Loch Sheldrake
12762	NY	Mongaup Valley
12763	NY	Mountain Dale
12779	NY	South Fallsburg
12780	NY	Sparrow Bush
19007	PA	Bristol
19123	PA	Philadelphia
19125	PA	Philadelphia
19134	PA	Philadelphia
19135	PA	Philadelphia
19136	PA	Philadelphia
19137	PA	Philadelphia

Data Source: 2013-2017 American Community Survey 5-year estimates

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EXHIBIT “D”
MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING, entered into as of _____, between the City of New York ("City") with an office located at City Hall, New York, NY 10007, the Building and Construction Trades Council of Greater New York and Vicinity ("BCTC"), on its behalf and on behalf of its affiliated unions, with its principal place of business located at 350 West 31st Street, New York, NY 10001, and the Building Trade Employers' Association of New York City ("BTEA"), on its behalf and on behalf of its affiliated contractors, with its principal place of business located at 1325 Avenue of the Americas, New York, NY 10019.

WHEREAS, since 2009, the City, the BCTC, and the BTEA have entered into Memoranda of Understanding (each an "MOU"), contemporaneous to the City entering to Project Labor Agreements with the BCTC (each a "PLA"), setting goals on new apprenticeship opportunities for graduates of direct entry pre-apprenticeship programs for low-income New Yorkers, minorities, high school students, women, veterans, NYCHA residents, and qualified employees of Minority- and Women-Owned Business Enterprises ("M/WBEs") that become signatory to the union, and have provided increased opportunities for New Yorkers to have access to good union construction careers;

WHEREAS, in 2014, the City and the BCTC entered into an MOU related to the New York City Build It Back Program and committed to encourage contractors and subcontractors to employ Sandy-impacted residents and for the City and the BCTC to work together with community-based organizations to recruit and train New York City residents, with an emphasis on Sandy-impacted low income residents;

WHEREAS, the BCTC and the BTEA committed to: (i) promote the representation of veterans, women, high school graduates of the City's public schools, and New Yorkers in need of economic opportunity in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors, and (ii) improve workforce training and development for entrance into the construction industry;

WHEREAS, in 2014, the City of New York issued *Career Pathways: One City Working Together*, with a commitment to maximize local job opportunities through the City's contracts, and as such the City is committed to ensuring that low-income New Yorkers have access to the good jobs and careers that are created through the City's capital investments and through this MOU and contemporaneous PLA, the City the BCTC, and with the cooperation of the BTEA contractors can connect low-income New Yorkers to good prevailing wage construction careers;

WHEREAS, through this MOU and contemporaneous PLAs, the City, the BCTC, and the BTEA commit to recruiting in low-income communities, providing opportunities through pre-apprenticeship and apprenticeship programs for access to construction careers, and ensuring residents of low-income communities, including apprentices, are provided opportunities to work on publicly-funded and -assisted construction projects;

WHEREAS, pursuant to Local Law 1 of 2013, the City is also committed to its M/WBE program, and in partnership with the M/WBE Leadership Association seeks to encourage eligible companies to certify as M/WBEs, and provides a wide range of training and technical assistance to build the capacity of its certified companies to bid successfully for the City's contracts and subcontracts;

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WHEREAS, an important element in the success of pre-apprenticeship and apprenticeship programs, as well as in creating work opportunities for contractors and sub-contractors in New York City, is the availability of work on publicly funded and assisted projects; and

WHEREAS, the parties to this MOU desire to publicly state their intentions with respect to apprenticeship programs and the creation of contracting and other economic opportunities in the construction industry.

NOW, THEREFORE, the City, the BCTC, and the BTEA state as follows:

1. Scope. This MOU:

a. States the intentions of the City, the BCTC, and the BTEA regarding:

- a. the provision of opportunities in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors;
- b. the City's application of apprenticeship requirements in City construction contracts from the time of execution through December 31, 2024;
- c. the joint goal of the City, the BCTC, and the BTEA to create employment opportunities, including apprenticeships, in the construction industry; and

b. Shall terminate on December 31, 2024

2. To facilitate the commitments set forth in this MOU, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with the Mayor's Office of Workforce Development ("WKDEV") to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

3. The BCTC and the BTEA shall work collaboratively with the City to reserve at least 500 new apprenticeship positions each calendar year through both the general recruitment and direct entry programs for New York City residents living in zip codes where at least 15% of the individuals in such zip code are below the federal poverty rate and NYCHA residents regardless of zip code.

4. The BCTC and BTEA shall work collaboratively with the City to reserve new apprenticeship positions each year for direct entry.

- a. New York State Department of Labor ("NYS DOL") approved Direct Entry programs may be used by sponsors of Registered Apprenticeship programs as another way to bring apprentices into their programs. It is a tool to help sponsors reach underrepresented populations. Direct Entry provides individuals who successfully complete an apprenticeship preparation program, and who meet the minimum requirements for a NYS Registered Apprenticeship program, with the direct opportunity for an interview with the sponsor of a program bypassing the general recruitment scheduled for the Apprentice Programs.**

5. Apprenticeship programs jointly sponsored by Local Unions and employers affiliated with the BTEA shall, subject to approval by the NYSDOL and to the extent consistent with applicable

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consent decrees, court orders or similar mandates, reserve up to the following percentages of their new apprenticeships (some apprentices may be counted in more than one category) for direct entry each year:

- a. 20% for graduates of New York City public high school who have completed pre-apprenticeship training provided by The Edward J. Malloy Initiative for Construction Skills ("C-SKILLS");
 - b. 10% for veterans of the U.S. Armed Forces who are referred by New York City Helmets to Hardhats ("NYC H2H"), provided, however, that any veterans whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage;
 - c. 15% for women who have completed pre-apprenticeship training provided by Nontraditional Employment for Women ("NEW");
 - d. 10% for NYCHA and Section 8 residents who have completed pre-apprenticeship training provided by C-SKILLS, NEW, the NYCHA Resident Training Academy ("NRTA"), or Pathways to Apprenticeships ("P2A");
 - e. 10% for justice-involved individuals who have completed pre-apprenticeship training provided by C-SKILLS, NEW, NRTA, or P2A; and
 - f. 5% for qualified employees of certified minority- and women-owned business enterprises and other employers not signatory to collective bargaining agreements of unions affiliated with the BCTC which become signatory to such collective bargaining agreements, provided, however, that any such employees whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage.
6. To help reach the goals set forth in paragraph 3, 4, and 5, the City, the BCTC and the BTEA will work cooperatively to identify and pursue appropriate sources of public and private funds and resources, as needed, to provide pre-apprenticeship training scaled to support the goals targeting at least seven hundred (700) pre-apprenticeship positions cumulatively for all above named direct entry programs each year. The City will help coordinate recruitment within the zip codes and target populations identified in paragraphs 3, 4 and 5.
 7. The goals in Paragraphs 3, 4, and 5 are aggregate goals for apprenticeship programs jointly sponsored by the Local Unions and BTEA contractors to achieve on an annual basis through their general recruitments and direct entry programs. The City recognizes that different apprenticeship programs face different circumstances and have varying capacities to meet the percentages set forth in each category; notwithstanding that, the BCTC and the BTEA agree to encourage and support meeting the goals in Paragraphs 3, 4, and 5, and to work with apprenticeship programs jointly sponsored by their affiliated unions and contractors to take affirmative steps to achieve that goal.
 8. The City, BCTC, and BTEA acknowledge that on federally funded projects NYCHA, and the City on certain federally funded projects, must comply with Executive Order 11246

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and federal regulations contained at 24 CFR Part 135 ("Section 3") regarding efforts to employ residents of NYCHA developments and other Section 3 populations.

9. The City, the BCTC, and the BTEA will jointly seek any necessary waivers from NYSDOL with respect to direct entry goals for the joint apprentice programs, as well as jointly support and encourage 100% participation of all affiliated joint apprentice programs.

10. Reporting.

- a. Each Local Union shall provide, or cause to be provided by their Apprentice Directors, copies of the following reports to WKDEV within thirty (30) days of the submission to NYSDOL:

- i. *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)* submissions to NYSDOL;
- ii. *Apprentice Training Program Affirmative Action Plan (AT 603)* submissions to NYSDOL; and
- iii. *Apprenticeship Agreement (AT 401)* submissions to NYSDOL.

- b. Pre-apprenticeship programs funded in part by the City will provide quarterly reports, beginning at the end of the first quarter after the first class is held, to the WKDEV with detailed information as required by NYC's Workforce Common Metrics reporting for all individuals trained in all classes.

- c. On an annual basis, beginning on January 1, 2021, the City shall provide an electronic report to the BCTC that contains a list of contracts registered in the previous full fiscal year that were subject to either a City Project Labor Agreement or the Apprenticeship Directive. Such list shall contain the following for each contract:

- i. contracting agency
- ii. contract name;
- iii. prime contractor name;
- iv. registered dollar amount; and
- v. date of registration.

- d. Upon mutual agreement, the parties may modify these reporting requirements, as needed.

11. **City of New York Apprenticeship Directive.** As a means of expanding the pool of work available to apprentices and graduates of state-approved apprenticeship programs providing opportunities to the groups of individuals designated in Paragraphs 3 and 5 above, the City states its intention to implement, as may be amended from time to time, the Directive, attached as Exhibit A. The Directive directs City agencies, for construction contracts where either (i) the cost estimate of the contract exceeds \$3 million, or (ii) the cost estimate of the contract exceeds \$2 million on a project with a cost estimate of at least \$5 million, and for such other contracts as the bidding agency determines to be appropriate, to require the contractor and any of its subcontractors with subcontracts worth at least \$2 million to have apprenticeship agreements appropriate for the type and scope of work to be performed that have been registered with, and approved by, the New York State

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Commissioner of Labor, and shall have passed any required probationary period and recertification established by the New York State DOL.

12. The City shall include a statement concerning the applicability of the Directive in every City Record notice of the solicitation or award of a contract for a public works project. Within five (5) days of the issuance of any waiver from the apprenticeship requirement, the City shall notify the BCTC and the BTEA, in writing or electronically, of the granting of such waiver and the reasons therefore.

13. The City, the BCTC, and the BTEA look forward to working together and with the contractor community in a spirit of cooperation and good will toward the goal that all New Yorkers from diverse backgrounds, particularly minorities, women, returning veterans, recent public high school graduates, NYCHA residents, individuals in need of economic opportunity, and justice-involved individuals, are well-prepared for participation in the workforce and can gain access to good careers in the construction industry, in both the private and public sectors.

For the City of New York

By: _____

First Deputy Mayor, Dean Fuleihan

For Building and Construction Trades Council of Greater New York and Vicinity

By: _____

Gary LaBarbera, President

For Building Trades Employers' Association of New York City

By: _____

Louis J. Coletti, President & CEO

SCHEDULE "B" - DRUG AND ALCOHOL POLICY

PREAMBLE

WHEREAS, [CONSTRUCTION MANAGER] ("Construction Manager"), for the construction project located at [PROJECT ADDRESS] ("Project") desires to provide for a safe, drug and alcohol-free work site for the Project;

WHEREAS, the parties have entered into a separate Project Labor Agreement for the Project and have agreed to negotiate in good faith a Project Drug & Alcohol Testing Policy;

WHEREAS, this Testing Policy is collectively negotiated between the Construction Manager and the New York City Building and Construction Trades Council ("Council") (the Construction Manager and BCTC are collectively referred to hereafter as the "Parties");

WHEREAS, the Parties each currently have respective drug and alcohol policies, including the Projects' Zero-Tolerance policy;

WHEREAS, the Parties desire to maximize project safety conditions for the Project personnel and public, as well as deter violations of the Parties' respective drug and alcohol policies;

NOW, THEREFORE, the Parties agree to this Policy as of the date hereof,

ARTICLE 1 - PARTIES

This Drug & Alcohol Testing Policy ("Policy") is hereby established by the Construction Manager and the Council, on behalf of itself and its affiliated local union members, and the signatory local unions on behalf of themselves and their members.

ARTICLE 2-GENERAL CONDITIONS

SECTION 2.1 - SUMMARY

In order to reinforce the Parties' respective drug and alcohol policies, including the Projects' zero tolerance policy regarding the prohibition of the use of drugs and alcohol, and to deter Project personnel from violating those policies, the Parties agree that all Project Personnel (defined later) will be required to submit to drug and/or alcohol testing randomly, post-accident, and for reasonable suspicion.

Any individual on site that violates this Policy is subject to disciplinary action, including, without limitation, loss of site access privileges.

SECTION 2.2 - REVOCATION OF PROJECT ACCESS PRIVILEGES

Any one of the following occurrences will result in the immediate revocation of a Project Personnel's project access privileges:

1. An individual is found selling or using drugs or alcohol, or otherwise is under the influence of drugs or alcohol, subject to the other terms of this Policy, on a Project Site;
2. An individual has been convicted under any criminal drug or alcohol statute for a violation occurring in the workplace within the past two years;
3. An individual who refuses to abide by the Projects' drug and alcohol policy, or refuses to submit to a test in accordance with this Policy;
4. An individual who switches, adulterates, or in any way tampers with a specimen

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required to be submitted in accordance with this Policy.

SECTION 2.3 - DEFINITIONS

Confirmed Positive Test: The presence of drugs, drug metabolites, or alcohol in a person's body that equals or exceeds the established cut off levels as defined in Exhibit I. For drugs, the sample will have undergone Laboratory screening and confirmation testing and must have been verified as positive by a Medical Review Officer. A positive test result for alcohol obtained through Evidential Breath Testing is considered a Confirmed Positive Test.

Employee Assistance Program (EAP): An EAP is generally considered a workplace-based, confidential program designed to help employees deal effectively with a variety of personal problems, and, of relevance to this policy, substance abuse problems. The EAP promotes assessments and short-term counseling. An EAP shall also include any similar education or rehabilitation program provided by the Councilor its respective members. The Project Personnel that are required to participate in the EAP shall be responsible for the cost of their consultation with an EAP and/or participation in any education or rehabilitation program.

Evidential Breath Testing Device (EBT): A device that is used to measure alcohol in the breath and which meets National Highway Traffic Safety Administration's specifications for precision and accuracy.

Laboratory: A laboratory that is SAMHSA (Substance Abuse and Mental Health Services Administration) certified for the testing of drugs.

Medical Review Officer (MRO): A licensed physician responsible for receiving laboratory results generated by an employer's drug testing plan who has knowledge of substance abuse disorders and medical training to interpret and evaluate a donor's confirmed positive test result together with his/her medical history and all other relevant information.

Previous Worker: All individuals whose employment relationship with the contractor, company or organization no longer exists.

Project Site: The construction area for respective Project.

Reasonable Suspicion: When a qualified trade contractor, the Developer or Construction Manager as set forth in Section 3.7, reasonably believes that an individual has violated this Policy. Reasonable suspicion is based upon (1) specific, current, behavioral or performance indicators, (2) the possible manufacture, distribution, consumption or possession of unauthorized drugs, drug paraphernalia, or alcohol, or (3) documented investigation by an agency retained by, or otherwise independent from, the Developer or Construction Manager.

SECTION 2.4 - INCLUDED SUBJECTS

This Policy shall cover all employees of the Owner, Construction Manager and Project trade contractors, their subcontractors and any other of their respective personnel at any level that are performing any activity at a Project Site, inclusive of managers, superintendents and supervisors, except as specifically excluded by Section 2.5 of this Policy (collectively and singularly, "Project Personnel").

SECTION 2.5 - EXCLUDED SUBJECTS

The following persons are not subject to the provisions of this Policy:

- A. Employees and entities engaged in off-site manufacture, modifications, repair,

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- maintenance, assembly, painting, handling or fabrication of components, materials, equipment or machinery;
- B. Vendors and employees of vendors engaged on a Project Site in equipment testing, inspection, training, warranty work, or engaged in corrections of defective or nonconforming work, unless such employees are expressly included in the bargaining unit of a local signatory to this Agreement;
 - C. Employees engaged in ancillary work on a Project which is performed by third parties, such as electric utilities, gas utilities, telephone companies, and railroads, or any other work not constituting Project work;
 - D. Employees of any governmental authority (state, local or otherwise);
 - E. Employees and contractors engaged in work on the Project Site as part of due diligence or monitoring, which work is ancillary to Project work; and
 - F. Emergency responders.

SECTION 2.6 - PRESCRIPTION AND NON-PRESCRIPTION DRUGS

The use of prescription drugs not prescribed directly to Project Personnel is prohibited, including the use of drugs prescribed to a spouse or domestic partner. The use of non-prescription drugs that are sold outside the United States and that contain substances that are illegal or require a prescription in the United States are prohibited, unless prescribed by a licensed physician.

SECTION 2.7 - SEARCHES

In order for the Construction Manager to ensure the safety of Project Personnel and for the Construction Manager to protect its assets, the Construction Manager shall have the right upon good cause (such as reasonable suspicion of a violation of this Policy) to conduct reasonable searches for alcohol, drugs and related paraphernalia anywhere within the boundaries of a Project Site. A search may include any assets owned or leased by any Project Personnel that is on a Project Site, including without limitation, vehicles, lockers, gang boxes, desks and personal property brought onto a Project Site, but excluding personal body searches or physical contact with employees.

ARTICLE 3 - DRUG & ALCOHOL TESTING

SECTION 3.1 - COLLECTION PROCESS

As of the execution date of this PLA, Project Personnel may be required to submit urine samples ("Preliminary Drug Screening") for the purpose of detecting the presence of drugs as part of the random, post-accident or reasonable suspicion testing, in accordance with chain of custody protocols as established by Substance Abuse and Mental Health Services Administration (SAMHSA), utilizing an instant result test cup for Preliminary Drug Screenings, such testing is to be performed on-site by an independent service provider. The results from the instant result test cup will be considered preliminary. The sample will be sent to a SAMHSA certified testing laboratory for confirmation.

As of the date hereof, all Project Personnel will be required to submit to an Evidential Breath Test (EBT) for the purpose of detecting the presence of alcohol when submitting to random, post-accident or reasonable suspicion testing. Alcohol testing will not be conducted for pre-access testing.

SECTION 3.2 - NEGATIVE PRELIMINARY DRUG SCREENING

Project Personnel with a negative Preliminary Drug Screening will be considered conditionally accepted for Project site access, pending confirming laboratory results. Site access privileges will be revoked if the subsequent laboratory results determine that the sample has tested positive for drugs or that the sample has been adulterated.

SECTION 3.3 POSITIVE PRELIMINARY DRUG SCREENING

If the Preliminary Drug Screening indicates a positive result, the individual will not be allowed access to the Project Site. The sample will be sent to the certified laboratory for analysis and, if applicable, reviewed by the Medical Review Officer (MRO). If the laboratory confirmation results are also positive, the individual will be considered in violation of this Policy and their site access will be revoked for at least 30 days. If the laboratory confirmation results are negative, the Project Personnel's site access will not be revoked.

SECTION 3.4 CONFIRMED POSITIVE TEST RESULTS

A. POSITIVE DRUG TEST

A drug test is considered positive if the test results exceed the limits shown in Exhibit 1, which is attached hereto and incorporated herein by reference. The test will be confirmed through a second analysis process and reviewed by an MRO before results are reported. Project Personnel with confirmed positive drug test results will have their site access revoked. In case of a "false positive" result, any such Personnel shall be entitled to the reimbursement of any wages lost during the suspension caused by any such false positive result.

B. POSITIVE EBT

An EBT is considered positive if the test results exceed .04 BrAC, or as otherwise set forth in Exhibit 1. Project Personnel with a positive alcohol test result will be subject to the remedies set forth in Exhibit 1.

C. REINSTATEMENT OF SITE ACCESS PRIVILEGES

(a) Subject to section 3.4(C)(a) immediately below, if the site access of a Project Personnel has been revoked pursuant to this Policy, then any such person may request that their site access be reinstated after 30 days, provided that all of the following conditions are met to the reasonable satisfaction of the Construction Manager. :

1. The individual has provided proof of wellness from an accredited rehabilitation facility or has provided proof that treatment isn't needed as attested to by a licensed health care provider specializing in the diagnosis and treatment of alcohol and drug abuse.
2. A current drug and alcohol test is obtained within three (3) days of the request for re-access to the site and proof of a negative test result has been received; and
3. The individual agrees to submit to multiple testing for two (2) full years from the date of gaining re-access to the project, the scheduling of which will be determined at the sole discretion of the Construction Manager. If all of these conditions have been met, the Construction Manager agrees that it will not unreasonably withhold their consent to any such request.

(b) Unlawful possession, concealment, use, purchase, sale, manufacture, dispensation or

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distribution of illegal drugs or un-prescribed controlled substances on the Project Site will subject the Project Personnel Employee to immediate removal from the Project Site and shall bar such Project Personnel Employee from returning for a minimum of three (3) months, which return shall, in any event, be subject to the reasonable approval by Construction Manager.

(c) All of the Parties agree that any such Project Personnel will only be entitled to any such reinstatement of site access privileges one time and that any subsequent violation of this Policy will result in the permanent termination of access to the Project Site.

SECTION 3.5 - RANDOM TESTING

A third-party provider designated by the Construction Manager will randomly select by an objective criteria a testing pool for random drug and/or alcohol testing from all Project Personnel with site access cards. Any individual selected for a random drug and/or alcohol test will be required to submit to an Evidential Breath Test (EBT) and/or drug test. Individuals may be tested more than once during any given time period. The Parties acknowledge and agree that an EBT may be required without a drug test and that a drug test may be required without an EBT, as solely determined by the Construction Manager.

If an individual is unable to attend the first scheduled random drug test as a result of being involved in a work-related task, such drug test will be rescheduled and will be completed at or before the conclusion of such employee's then current work shift. If the second drug test is missed for any reason, the incident will be reviewed by the Construction Manager, who shall have the right to terminate the site access privileges of any such Project Personnel until such time as that Project Personnel has complied with this Policy. If the individual refuses to take the test, their access privileges will be immediately terminated for cause.

SECTION 3.6 - POST ACCIDENT TESTING

After each work-related incident or injury requiring the services of a licensed health care provider, all Project Personnel involved with the incident will be required to submit to a drug and/or alcohol test immediately following the incident. In instances where emergency care is necessary, the drug and/or alcohol test shall be obtained by the care facility, if possible, within 24 hours after treatment is rendered. If more than 48 hours have passed before an injury is reported and treated by a licensed health care provider, an alcohol test will not be required.

In addition, any Project Personnel involved in a non-injury related incident at a Project Site with damages at or in excess of \$200 will be required to submit to a drug and/or alcohol test unless:

- A. It is determined, after conducting an investigation and interviewing all employees involved and any witnesses, that the employee's performance can be completely discounted as a contributing factor to the incident; or
- B. It is determined, after conducting an incident investigation and interviewing all employees and any witnesses that the incident was caused by inadequate equipment or system design, and/or premature failure of equipment or system components.

SECTION 3.7 - REASONABLE SUSPICION TESTING

All Project Personnel will be required to submit to a drug and/or alcohol test when there is reasonable suspicion the individual has violated this policy.

Reasonable suspicion includes, without limitation, the following:

- A. Violent or irrational behavior;

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- B. Emotional or physical unsteadiness;
- C. Sensory or motor-skill malfunctions;
- D. Slurred speech;
- E. The odor of alcohol or drugs on clothing or breath in conjunction with other indicators;
- F. Possession of alcohol, unauthorized drugs or drug paraphernalia; or
- G. Documented evidence of an independent investigation regarding Project Personnel's consumption of what is reasonably believed to be an alcoholic beverage or drugs in violation of the Project's policies and/or this Policy.

Reasonable suspicion testing may only be ordered by supervisory personnel that: (a) have been trained to recognize the above referenced factors; or (b) have received credible documentary evidence from an independent investigator that a Project Personnel has violated a drug and/or alcohol policy. It is agreed that any certified training program shall satisfy the training requirement.

SECTION 3.8 - PRIVACY CONSIDERATIONS

The Parties agree to use reasonable efforts to conduct any testing pursuant to this Policy in accordance with the privacy concerns of Project Personnel. To address these concerns, the Parties agree that:

1. The testing station(s) shall be screened off, or otherwise closed off from public view.
2. All documents and information regarding the testing, including test results, shall be maintained by the respective custodian(s) of record in accordance with their respective privacy policies, which any Project Personnel shall be entitled to review upon timely request.
3. The Parties agree to make a good faith effort to resolve any other privacy concern of Project Personnel regarding this Policy, provided that any such concerns do not interfere with the purpose of this Policy.

ARTICLE 4 – GRIEVANCE

SECTION 4.1 - REPRESENTED WORKERS

Nothing in this Policy shall restrict a member of a signatory local union from filing a grievance in accordance with the member's collective bargaining agreement or a Project Labor Agreement, provided that the grievance shall be limited to whether the removal of a member for violation of this Policy was conducted in compliance with the terms and conditions set forth herein.

SECTION 4.2 - HOLD HARMLESS

The Construction Manager agrees to hold harmless and indemnify the Union/Council and its representatives from any liability that may be incurred as a result of the Company's Drug and Alcohol Policy to the extent caused by the negligence or intentional misconduct of the Construction Manager.

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IN WITNESS WHEREOF the parties have agreed to this Policy as of _____, 20__.

FOR [CONSTRUCTION MANAGER]

By: _____

Name: [INSERT NAME] _____

Title: [INSERT TITLE] _____

FOR GREATER NEW YORK CITY BUILDING TRADES COUNCIL

By: _____

Name: Gary LaBarbera _____

Title: President

EXHIBIT 1

CLASS OF DRUGS TESTED AND THEIR RESPECTIVE CUT-OFF LIMITS

The cut-off limits established are those recommended by the U.S. Department of Health and Human Services in their mandatory Guidelines for Federal Workplace Drug Testing Programs.

<u>Drug Class</u>	<u>Screening Cut-Off Limit (ng/ml)</u>	<u>Confirmation Cut-off Limit (ng/ml)</u>
Amphetamines	1000	500
Benzoyllecgonine (Cocaine Metabolite)	300	150
Cannabinoids (THC)	50	15
*Opiates	2000	10
Phencyclidine (PCP)	25	25

Confirmation screening is done by means of GC/MS analysis.

*The GC/MS confirmation for opiates will be for both codeine and morphine separately. If morphine is equal to or greater than 2,000ng/ml then the GC/MS confirmation analysis for 6-acetylmorphine (6-MAM) is at a cut-off level of 10ng/ml.

Alcohol Screening

All Project Personnel will be required to submit to an EBT under the random, post-accident, and reasonable suspicion test arenas, for the purpose of detecting presence of alcohol. If this test supports a positive result for presence of alcohol, the Project Personnel will be considered in violation of this Policy.

If the results of the EBT are:

1. Above 0.001 BrAC, but at or below 0.020 BrAC, a second test will be conducted within approximately 15 minutes.
 - If the second BrAC test is less than the first BrAC, the results will be deemed negative and the Project Personnel may return to work, if there are no other outstanding issues.
 - If the second BrAC is increasing, but below 0.04 BrAC, the results will be deemed negative, but the Project Personnel will be sent home for the day and the Construction Manager shall be notified. If a Project Personnel is sent home two times within a six-month period pursuant to this Section I, then any such Project Personnel shall be deemed to have tested positive and will be subject to the applicable remedies set forth in Section 2 below.
2. Above 0.02 BrAC, but below 0.06 BrAC, a second test will be conducted after approximately 15 minutes.
 - Notwithstanding anything set forth above to the contrary, a Project Personnel may elect to voluntarily go home for the day instead of taking a second test and the results will

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- be deemed negative, provided that any such Project Personnel may not voluntarily go home more than once within a twelve month period.
- If the second BrAC test is at or below 0.02 BrAC, the results will be deemed negative and the Project Personnel may return to work if there are no other outstanding issues.
 - If the second BrAC test is above 0.020, but below 0.06, the results will be deemed positive, the Project Personnel will be sent home for the day and their site access will be revoked for at least five [5] calendar days and until such time as the Project Personnel has been evaluated by an EAP professional skilled in substance abuse and confirmed fit for duty.
 - Any Project Personnel who is deemed positive two times within two years pursuant to this Section 2 will have their site access privileges terminated and will be entitled to the limited relief set forth in Section 3 .4(c) of the Policy.
3. At or above .06 BrAC, the Project Personnel will have their site access privileges terminated, after which they will be entitled to the limited relief set forth in Section 3.4(C) of the Policy.

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NEW CONSTRUCTION PLA ADDENDUM

In accordance with Article 3, Section 1 of the 2020-2024 NYC Agency New Construction PLA (“New Construction PLA”), the Department of Design and Construction (“DDC”) and the Building and Construction Trades Council of Greater New York and Vicinity, on behalf of itself and its affiliated Local Unions, agree to this addendum to include the below new construction contract (the “Project”) as Program Work:

- Construction of a New York City Police Department Bomb Squad Building, on the Rodman’s Neck site in the Bronx, New York, known as contract number **SANDBOMB**.

Pursuant to Article 3, Section 1 of the New Construction PLA, a feasibility study was conducted for the Project by an independent consultant that determined that including the Project as Program Work in the New Construction PLA will result in significant cost savings for DDC and the City of New York (“City”). Based on the foregoing, the City has determined that it is in its best interest to agree to this addendum.

IN WITNESS WHEREOF the parties have caused this addendum to the New Construction PLA to be executed and effective as of the 13 day of October 2022.

For Building and Construction Trades Council of Greater New York and Vicinity

BY: Gary LaBarbera
Gary LaBarbera, President

For New York City Department of Design and Construction

BY: [Signature]
Commissioner Thomas Foley

Approved as to form:

Isabel Galis-Menendez CD
Acting Corporation Counsel
New York City

Date: 10/11/2022

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
INFORMATION FOR BIDDERS
December 2021

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CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
INFORMATION FOR BIDDERS

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1. Description and Location of Work

The description and location of the work for which bids are requested are specified in the PASSPort RFX field "Description".

2. Time and Place for Receipt of Bids

Sealed bids shall be received on or before the date and hour specified in the PASSPort RFX, at which time they will be publicly opened and read aloud in the presence of the Commissioner or the Commissioner's or her representative, and any bidders who may desire to be present.

3. Definitions

The definitions set forth in the Procurement Policy Board Rules shall apply to this Invitation For Bids.

4. Invitation For Bids and Contract Documents

(A) Except for titles, sub-titles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience) the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of the Contract and the Invitation for Bids.

- (1) All provisions required by law to be inserted in this Contract, whether actually inserted or not
- (2) The Contract Drawings and Specifications
- (3) The General Conditions, the General Requirements and the Special Conditions, if any
- (4) The Contract
- (5) The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and the Bid Booklet
- (6) The Budget Director's Certificate; all Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed with the Work.

(B) For particulars as to this procurement, including quantity and quality of the purchase, extent of the work or labor to be performed, delivery and performance schedule, and any other special instructions, prospective bidders are referred to the Invitation For Bids Documents. A copy of such documents can be obtained in the PASSPort RFX.

5. Pre-Bid Conference

A pre-bid conference shall be held as set forth in the PASSPort RFX. Nothing stated at the pre-bid conference shall change the terms or conditions of the Invitation For Bids Documents, unless a change is made by written amendment as provided in Section 9 below. Failure to attend a mandatory pre-bid conference shall constitute grounds for the rejection of the bid.

6. Agency Contact

Any questions or correspondence relating to this bid solicitation shall be addressed to the Agency Contact person specified in the PASSPort RFX.

7. Bidder's Oath

- (A) The bid shall be properly signed by an authorized representative of the bidder and the bid shall be verified by the written oath of the authorized representative who signed the bid, that the several matters stated and information furnished therein are in all aspects true.
- (B) A materially false statement willfully or fraudulently made in connection with the bid or any of the forms completed and submitted with the bid may result in the termination of any Contract between the City and the Bidder. As a result, the Bidder may be barred from participating in future City contracts as well as be subject to possible criminal prosecution.

8. Examination and Viewing of Site, Consideration of Other Sources of Information and Changed Conditions

- (A) Pre-Bidding (Investigation) Viewing of Site - Bidders must carefully view and examine the site of the proposed work, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions on, about or above the site relating to or affecting in any way the performance of the work to be done under the Contract which were or should have been indicated to a reasonably prudent bidder. To arrange a date for visiting the work site, bidders are to contact the Agency Contact person specified in The PASSPort RFx.
- (B) Should the contractor encounter during the progress of the work subsurface conditions at the site materially differing from any shown on the Contract Drawings or indicated in the Specifications or such subsurface conditions as could not reasonably have been anticipated by the contractor and were not anticipated by the City, which conditions will materially affect the cost of the work to be done under the Contract, the attention of the Commissioner must be called immediately to such conditions before they are disturbed. The Commissioner shall thereupon promptly investigate the conditions. If the Commissioner finds that they do so materially differ, or that they could not reasonably have been anticipated by the contractor and were not anticipated by the City, the Contract may be modified with the Commissioner's written approval.

9. Examination of Proposed Contract

- (A) Request for Interpretation or Correction: Prospective bidders must examine the Contract Documents carefully and before bidding must request the Commissioner in writing for an interpretation or correction of every patent ambiguity, inconsistency or error therein which should have been discovered by a reasonably prudent bidder. Such interpretation or correction, as well as any additional contract provisions the Commissioner may decide to include, will be issued in writing by the Commissioner as an addendum to the Contract, which will be transmitted to each person recorded as having received a copy of the Contract Documents from the Department. Transmission of such addendum will be by mail, e-mail, facsimile or hand delivery. Such addendum will also be posted at the place where the Contract Documents are available for the inspection of prospective bidders. Upon transmission as provided for herein, such addendum shall become a part of the Contract Documents, and binding on all bidders, whether or not actual notice of such addendum is shown.
- (B) Only Commissioner's Interpretation or Correction Binding: Only the written interpretation or correction so given by the Commissioner shall be binding, and prospective bidders are warned that no other officer, agent or employee of the City is authorized to give information concerning, or to explain or interpret, the Contract.
- (C) Documents given to a subcontractor for the purpose of soliciting the subcontractor's bid shall include either a copy of the bid cover sheet or a separate information sheet setting forth the project name, the Contract number (if available), the contracting agency and the Project's location.

10. Form of Bid

Each bid must be submitted upon the prescribed form and must contain: a) the name, residence and place of business of the person or persons making the same; b) the names of all persons interested therein, and if no other person is so interested, such fact must be distinctly stated; c) a statement to the effect that it is made without any connection with any other person making a bid for the same purpose and that it is in all respects fair and without collusion or fraud; d) a statement that no Council member or other officer or employee or person whose salary is payable in whole or part from the City Treasury is directly or indirectly interested therein or in the supplies, materials or equipment and work or labor to which it relates, or in any portion of the profits thereof; e) a statement that the bidder is not in arrears to the City or to any agency upon a debt or contract or taxes, and is not a defaulter as surety or otherwise upon any obligation to the City to any agency thereof, except as set forth in the bid.

THE BID SHALL BE TYPEWRITTEN OR WRITTEN LEGIBLY IN INK. THE BID SHALL BE SIGNED IN INK. ERASURES OR ALTERATIONS SHALL BE INITIALED BY THE SIGNER IN INK. FAILURE TO CONFORM TO THE REQUIREMENTS OF THIS SECTION 10 SHALL RESULT IN THE REJECTION OF THE BID.

11. Irrevocability of Bid

The prices set forth in the bid cannot be revoked and shall be effective until the award of the Contract, unless the bid is withdrawn as provided for in Sections 15 and 18 below.

12. Acknowledgment of Amendments

The receipt of any amendment to the Contract Documents shall be acknowledged by the bidder in its bid submission.

13. Bid Samples and Descriptive Literature

Bid samples and descriptive literature shall not be submitted by the bidder, unless expressly requested elsewhere in the Contract or Contract Documents. Any unsolicited bid samples or descriptive literature which are submitted shall not be examined or tested and shall not be deemed to vary any of the provisions of this Contract.

14. Proprietary Information/Trade Secrets

- (A) The bidder shall identify those portions of the bid which it deems to be confidential, proprietary information or trade secrets, and provide justification why such materials shall not be disclosed by the City. All such materials shall be clearly indicated by stamping the pages on which such information appears, at the top and bottom thereof with the word "Confidential". Such materials stamped "Confidential" must be easily separable from the non-confidential sections of the bid.
- (B) All such materials so indicated shall be reviewed by the Agency and any decision not to honor a request for confidentiality shall be communicated in writing to the bidder. For those bids which are unsuccessful, all such confidential materials shall be returned to the bidder. Prices, makes and model or catalog numbers of the items offered, deliveries, and terms of payment shall be publicly available after bid opening, regardless of any designation of confidentiality made by the bidder.

15. Pre-Opening Modification or Withdrawal of Bids

Bids may be modified or withdrawn by written notice received in the office designated in the PASSPort RFx, before the time and date set for the bid opening. If a bid is withdrawn in accordance with this Section, the bid security, if any, shall be returned to the bidder.

16. Bid Evaluation and Award

In accordance with the New York City Charter, the Procurement Policy Board Rules and the terms and conditions of this Invitation For Bids, this Contract shall be awarded, if at all, to the responsible bidder whose bid meets the requirements and evaluation criteria set forth in the Invitation For Bids, and whose bid price is either the most favorable bid price or, if the Invitation For Bids so states, the most favorable evaluated bid price. A bid may not be evaluated for any requirement or criterion that is not disclosed in the Invitation For Bids.

Restriction: No negotiations with any bidder shall be allowed to take place except under the circumstances and in the manner set forth in Section 21. Nothing in this Section shall be deemed to permit a contract award to a bidder submitting a higher quality item than that designated in the Invitation For Bids, if that bid is not also the most favorable bid.

17. Late Bids, Late Withdrawals and Late Modifications

Any bid received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. Any request for withdrawal or modification received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. The exception to this provision is that a late modification of a successful bid that makes the bid terms more favorable to the City shall be considered at any time it is received.

18. Withdrawal of Bids.

Except as provided for in Section 15, above, a bidder may not withdraw its bid before the expiration of forty-five (45) days after the date of the opening of bids; thereafter, a bidder may withdraw its bid only in writing and in advance of an actual award. If within sixty (60) days after the execution of the Contract, the Commissioner fails to fix the date

for commencement of work by written notice to the bidder, the bidder at the bidder's option, may ask to be relieved of the bidder's obligation to perform the work called for by written notice to the Commissioner. If such notice is given to the Commissioner, and the request to withdraw is granted, the bidder waives all claims in connection with this Contract.

19. Mistake in Bids

(A) Mistake Discovered Before Bid Opening: A bidder may correct mistakes discovered before the time and date set for bid opening by withdrawing or correcting the bid as provided in Section 15 above.

(B) Mistakes Discovered Before Award

(1) In accordance with General Municipal Law (Section 103, subdivision 11), where a unilateral error or mistake is discovered in a bid, such bid may be withdrawn upon written approval of the Agency Chief Contracting Officer if the following conditions are met:

(a) The mistake is known or made known to the agency prior to the awarding of the Contract or within 3 days after the opening of the bid, whichever period is shorter; and

(b) The price bid was based upon an error of such magnitude that enforcement would be unconscionable; and

(c) The bid was submitted in good faith and the bidder submits credible evidence that the mistake was a clerical error as opposed to a judgment error; and

(d) The error in the bid is actually due to an unintentional and substantial arithmetic error or an unintentional omission of a substantial quantity of work, labor, material or services made directly in the compilation of the bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of the original work paper, documents, or materials used in the preparation of the bid sought to be withdrawn; and

(e) It is possible to place the agency in the same position as existed prior to the bid.

(2) Unless otherwise required by law, the sole remedy for a bid mistake in accordance with this Article shall be withdrawal of the bid, and the return of the bid bond or other security, if any, to the bidder. Thereafter, the agency may, in its discretion, award the Contract to the next lowest bidder or rebid the Contract. Any amendment to or reformation of a bid or a Contract to rectify such an error or mistake therein is strictly prohibited.

(3) If the mistake and the intended correct bid are clearly evident on the face of the bid document, the bid shall be corrected to the intended correct bid and may not be withdrawn. Examples of mistakes that may be corrected are typographical errors, errors in extending unit prices, transposition errors and arithmetical errors.

20. Low Tie Bids

(A) When two or more low responsive bids from responsible bidders are identical in price, meeting all the requirements and criteria set forth in the Invitation For Bids, the Agency Chief Contracting Officer will break the tie in the following manner and order of priority:

(1) Award to a certified New York City small, minority or woman-owned business entity bidder;

(2) Award to a New York City bidder;

(3) Award to a certified New York State small, minority or woman-owned business bidder;

(4) Award to a New York State bidder.

(B) If two or more bidders still remain equally eligible after application of paragraph (A) above, award shall be made by a drawing by lot limited to those bidders. The bidders involved shall be invited to attend the drawing. A witness shall be present to verify the drawing and shall certify the results on the bid tabulation sheet.

21. Rejection of Bids

- (A) **Rejection of Individual Bids**: The Agency may reject a bid if:
- (1) The bidder fails to furnish any of the information required pursuant to Section 24 or 28 hereof; or if
 - (2) The bidder is determined to be not responsible pursuant to the Procurement Policy Board Rules; or if
 - (3) The bid is determined to be non-responsive pursuant to the Procurement Policy Board Rules; or if
 - (4) The bid, in the opinion of the Agency Chief Contracting Officer, contains unbalanced bid prices and is thus non-responsive, unless the bidder can show that the prices are not unbalanced for the probable required quantity of items, or if the imbalance is corrected pursuant to Section 15.
- (B) **Rejection of All Bids**: The Agency, upon written approval by the Agency Chief Contracting Officer, may reject all bids and may elect to resolicit bids if in its sole opinion it shall deem it in the best interest of the City so to do.
- (C) **Rejection of All Bids and Negotiation With All Responsible Bidders**: The Agency Head may determine that it is appropriate to cancel the Invitation For Bids after bid opening and before award and to complete the acquisition by negotiation. This determination shall be based on one of the following reasons:
- (1) All otherwise acceptable bids received are at unreasonable prices, or only one bid is received and the Agency Chief Contracting Officer cannot determine the reasonableness of the bid price, or no responsive bid has been received from a responsible bidder; or
 - (2) In the judgment of the Agency Chief Contracting Officer, the bids were not independently arrived at in open competition, were collusive, or were submitted in bad faith.
- (B) When the Agency has determined that the Invitation for Bids is to be canceled and that use of negotiation is appropriate to complete the acquisition, the contracting officer may negotiate and award the Contract without issuing a new solicitation, subject to the following conditions:
- (1) prior notice of the intention to negotiate and a reasonable opportunity to negotiate have been given by the contracting officer to each responsible bidder that submitted a bid in response to the Invitation for Bids;
 - (2) the negotiated price is the lowest negotiated price offered by a responsible bidder; and
 - (3) the negotiated price is lower than the lowest rejected bid price of a responsible bidder that submitted a bid in response to the Invitation for Bids.

22. Right to Appeal Determinations of Non-Responsiveness or Non-Responsibility and Right to Protest Solicitations and Award

The bidder has the right to appeal a determination of non-responsiveness or non-responsibility and has the right to protest a solicitation and award. For further information concerning these rights, the bidder is directed to the Procurement Policy Board Rules.

23. Affirmative Action and Equal Employment Opportunity

This Invitation For Bids is subject to applicable provisions of Federal, State and Local Laws and executive orders requiring affirmative action and equal employment opportunity.

24. PASSPort COMPLIANCE

All vendors that intend to do business with the City of New York must complete a disclosure process in order to be considered for a contract. This disclosure process was formerly completed using Vendor Information Exchange System (VENDEX) paper-based forms. The City of New York has moved collection of vendor disclosure information online. In early August 2017, the New York City Mayor's Office of Contract Services (MOCS) launched the Procurement and Sourcing Solutions Portal (PASSPort), a new online procurement system that replaced the paper-VENDEX process. In anticipation of awards, all bidders must create online accounts in the new PASSPort system, and

file all disclosure information using PASSPort. Paper submissions, including certifications of no changes to existing VENDEX packages, will not be accepted in lieu of complete online filings using PASSPort.

All vendors that intend to do business with the City, but specifically those that fall into any of the following categories, are required to enroll:

- Have a pending award with a City Agency; or
- Hold a current contract with a City Agency and have either an expiring VENDEX or expiring Certificate of No Change.

The Department of Design and Construction (DDC) and MOCS hereby notifies all proposers that the PASSPort system is available, and that disclosure filing completion is required prior to any award through this competitive bid.

To enroll in PASSPort and to access the PASSPort website (including online training), please visit www.nyc.gov/passport. Contact MOCS at passport@mocs.nyc.gov for additional information and technical support.

25. Complaints About the Bid Process

The New York City Comptroller is charged with the audit of contracts in New York City. Any vendor who believes that there has been unfairness, favoritism or impropriety in the bid process should inform the Comptroller, Office of Contract Administration, One Centre Street, Room 835, New York, New York; telephone number (212)669-2323.

26. Bid, Performance and Payment Security

(A) Bid Security: Each bid must be accompanied by bid security in an amount and type specified in the PASSPort RFX questionnaire. The bid security shall assure the City of New York of the adherence of the bidder to its proposal, the execution of the Contract, and the furnishing of Performance and Payment Bonds by the bidder, if required in the PASSPort RFX. Bid security shall be returned to the bidder as follows:

- (1) Within ten (10) days after the bid opening, the Comptroller will be notified to return the deposits of all but the three (3) lowest bidders. Within five (5) days after the award, the Comptroller will be notified to return the deposits of the remaining two unsuccessful bidders.
- (2) Within five (5) days after the execution of the Contract and acceptance of the Contractor's bonds, the Comptroller will be notified to return the bid security of the successful bidder or, if performance and payment bonds are not required, only after the sum retained under Article 21 of the Contract equals the amount of the bid security.
- (3) Where all bids are rejected, the Comptroller will be notified to return the deposit of the three (3) lowest bidders at the time of rejection.

(B) Performance and Payment Security: Performance and Payment Security must be provided in an amount and type specified in the PASSPort RFX. The performance and payment security shall be delivered by the contractor prior to or at the time of execution of the Contract. If a contractor fails to deliver the required performance and payment security, its bid security shall be enforced, and an award of Contract may be made to the next lowest responsible and responsive bidder, or the contract may be rebid.

(C) Acceptable Types of Security: Acceptable types of security for bids, performance, and payment shall be limited to the following:

- (1) a one-time bond in a form satisfactory to the City;
- (2) a bank certified check or money order;
- (3) obligations of the City of New York; or
- (4) other financial instruments as determined by the Office of Construction in consultation with the Comptroller.

Whenever the successful bidder deposits obligations of the City of New York as performance and payment security, the Comptroller may sell and use the proceeds thereof for any purpose for which the principal or

surety on such bond would be liable under the terms of the Contract. If the money is deposited with the Comptroller, the successful bidder shall not be entitled to receive interest on such money from the City.

- (D) Form of Bonds: Security provided in the form of bonds must be prepared on the form of bonds authorized by the City of New York. Forms for bid, performance, and payment bonds are included in the Invitation for Bids Documents. Such bonds must have as surety thereunder such surety company or companies as are: (1) approved by the City of New York; (2) authorized to do business in the State of New York, and (3) approved by the Department of the Treasury of the United States. Premiums for any required bonds must be included in the base bid.

The bidder is advised that submission of a bid bond where the surety on such bond fails to meet the criteria set forth herein, shall result in the rejection of the bid as non-responsive.

The Department of the Treasury of the United States advises that information concerning approved surety companies may be obtained as follows: (1) from the Government Printing Office at 215-364-6465; (2) through the Internet at <https://www.fiscal.treasury.gov/surety-bonds/>.

- (E) Power of Attorney: Attorneys in fact who sign bid, performance, or payment bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

27. Failure to Execute Contract

In the event of failure of the successful bidder to execute the Contract and furnish the required security within ten (10) days after notice of the award of the Contract, the deposit of the successful bidder or so much thereof as shall be applicable to the amount of the award made shall be retained by the City, and the successful bidder shall be liable for and hereby agrees to pay on demand the difference between the price bid and the price for which such Contract shall be subsequently awarded, including the cost of any required reletting and less the amount of such deposit. No plea of mistake in such accepted bid shall be available to the bidder for the recovery of the deposit or as a defense to any action based upon such accepted bid. Further, should the bidder's failure to comply with this Section cause any funding agency, body or group (Federal, State, City, Public, Private, etc.) to terminate, cancel or reduce the funding on this project, the bidder in such event shall be liable also to the City for the amount of actual funding withdrawn by such agency on this project, less the amount of the forfeited deposit.

28. Bidder Responsibilities and Qualifications

- (A) Bidders must include with their bids all information necessary for a determination of bidder responsibility, as set forth in the Specifications.
- (B) The Agency may require any bidder or prospective bidder to furnish all books of account, records, vouchers, statements or other information concerning the bidder's financial status for examination as may be required by the Agency to ascertain the bidder's responsibility and capability to perform the Contract. If required, a bidder must also submit a sworn statement setting forth such information as the Agency may require concerning present and proposed plant and equipment, the personnel and qualifications of the bidder's working organizations, prior experience and performance record.
- (C) Oral Examination on Qualifications: In addition thereto, and when directed by the Agency, the bidder, or a responsible officer, agent or employee of the bidder, must submit to an oral examination to be conducted by the Agency in relation to the bidder's proposed tentative plan and schedule of operations, and such other matters as the Agency may deem necessary in order to determine the bidder's ability and responsibility to perform the work in accordance with the Contract. Each person so examined must sign and verify a stenographic transcript of such examination noting thereon such corrections as such person may desire to make.
- (D) If the bidder fails or refuses to supply any of the documents or information set forth in paragraph (B) hereof or fails to comply with any of the requirements thereof, the Agency may reject the bid.

29. Employment Report

In accordance with Executive Order No. 50 (1980) as modified by Executive Order 108 (1986), the filing of a

completed Employment Report (ER) is a requirement of doing business with the City of New York for construction contractors with contracts of \$1,000,000 or more and subcontractors with construction subcontracts of \$750,000 or more. The required forms and information are included in the PASSPort Vendor Profile.

30. Labor Law Requirements

- (A) General: The successful bidder will be required to comply strictly with all Federal, State and local labor laws and regulations.
- (B) New York State Labor Law: This Contract is subject to New York State Labor Law Section 220, which requires that construction workers on the site be paid prevailing wages and supplements. The Contractor is reminded that all wage provisions of this Contract will be enforced strictly and failure to comply will be considered when evaluating performance. Noncompliance may result in the contractor being debarred by the City from future contracts. Complaints filed with the Comptroller may result in decisions which may debar a contractor from bidding contracts with any state governmental entity and other political subdivisions.
- (C) Records: The Contractor is expected to submit accurate payroll reports and other required documents and verify attendance and job classifications being utilized in compliance with the law, Contract provisions and agency procedures.

31. Insurance

- (A) Bidders are advised that the insurance requirements contained herein are regarded as material terms of the Contract. As required by Article 22 of the Contract, the contractor must effect and maintain with companies licensed and authorized to do business in the State of New York, the types of insurance set forth therein, when required by and in the amounts set forth in Schedule A of the General Conditions. Such required insurance must be provided from the date the contractor is ordered to commence work and up to the date of final acceptance of all required work.
- (B) The contractor must, within ten days of receipt of the notice of award, submit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A of the General Conditions, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by Section 57 of the New York State Workers' Compensation Law and Section 220 of the Disability Benefits Law.

32. Lump Sum Contracts

- (A) Comparison of Bids: Bids on Lump Sum Contracts will be compared on the basis of the lump sum price bid, adjusted for alternate prices bid, if any.
- (B) Lump Sum Bids for "General Construction Work" which include excavation shall include all necessary excavation work defined in the Specifications as being included in the lump sum bid. The bidder shall also bid a unit price for the additional cost of excavating material which is defined in the Specifications as excavation for which additional payment will be made. The total estimated additional cost of removing such material will be taken as the quantity set forth in the Engineer's Estimate multiplied by the unit price bid. This total estimated cost of additional excavation shall be added to the lump sum bid for the General Construction Work for the purpose of comparing bids to determine the low bidder.
- (C) Variations from Engineer's Estimate: The Engineer's Estimate of the quantity of excavation for which additional payment will be made is approximate only and is given solely to be used as a uniform basis for the comparison of bids and such estimate is not to be considered as part of this contract. The quantities actually required to complete the contract work may be more or less than the quantities in the Engineer's Estimate and, if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

33. Unit Price Contracts

- (A) Comparison of Bids: Bids on Unit Price Contracts will be compared on the basis of a total estimated price,

arrived at by taking the sum of the estimated quantities of such items, in accordance with the Engineer's Estimate of Quantities set forth in the Bid Schedule, multiplied by the corresponding unit prices, and including any lump sum bids on individual items.

(B) Variations from Engineer's Estimate: Bidders are warned that the Engineer's Estimate of Quantities on the various items of work and materials is approximate only, given solely to be used as a uniform basis for the comparison of bids, and is not be considered part of this contract. The quantities actually required to complete the contract work may be less or more than so estimated, and if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

(C) Overruns: The terms and conditions applicable to overruns of unit price items are set forth in Article 26 of the Contract.

34. Excise Tax

Bidders are referred to the Specifications for information on Federal Excise Tax exemptions.

35. Licenses and Permits

The successful bidder will be required to obtain all necessary licenses and permits necessary to perform the work.

36. Multiple Prime Contractors

If more than one prime contractor will be involved on this project, all contractors are required to examine the Invitation for Bid packages for all other parts of the project.

37. Locally Based Enterprise Requirements (LBE)

This Contract is subject to the requirements of Administrative Code, Section 6-108.1, and the regulations promulgated thereunder. No construction contract will be awarded unless and until these requirements have been complied with in their entirety. The bidder is advised of the provisions set forth below, as well as the provisions with respect to the Locally Based Enterprise Program contained in Article 67 of the Contract. The contractor is advised that:

(A) If any portion of the Contract is subcontracted, not less than ten percent of the total dollar amount of the contract shall be awarded to locally based enterprises ("LBEs"); except, where less than ten percent of the total dollar amount of the Contract is subcontracted, such lesser percentage shall be so awarded.

(B) No contractor shall require performance and payment bonds from LBE subcontractors.

(C) No Contract shall be awarded unless the contractor first identifies in its bid:

(1) the percentage, dollar amount and type of work to be subcontracted; and

(2) the percentage, dollar amount and type of work to be subcontracted to LBEs.

(D) Within ten calendar days after notification of low bid, the apparent low bidder shall submit an "LBE Participation Schedule" to the contracting agency. If such schedule does not identify sufficient LBE subcontractors to meet the requirements of Administrative Code Section 6-108.1, the apparent low bidder shall submit documentation of its good faith efforts to meet such requirements.

(1) The "LBE Participation Schedule" shall include:

(a) the name and address of each LBE that will be given a subcontract,

(b) the percentage, dollar amount and type of work to be subcontracted to the LBE, and

(c) the dates when the LBE subcontract work will commence and end.

(2) The following documents shall be attached to the "LBE Participation Schedule":

(a) verification letters from each subcontractor listed in the "LBE Participation Schedule" stating that the LBE will enter into a formal agreement for work,

- (b) certification documents of any proposed LBE subcontractor which is not on the LBE certified list, and
 - (c) copies of the certification letter of any proposed subcontractor which is an LBE.
- (3) Documentation of good faith efforts to achieve the required LBE percentage shall include as appropriate but not limited to the following:
- (a) attendance at prebid meetings, when scheduled by the agency, to advise bidders of contract requirements;
 - (b) advertisement where appropriate in general circulation media, trade association publications and small business media of the specific subcontracts that would be at least equal to the percentage goal for LBE utilization specified by the contractor;
 - (c) written notification to association of small, minority and women contractors soliciting specific subcontractors;
 - (d) written notification by certified mail to LBE firms that their interest in the contract is solicited for specific work items and their estimated values;
 - (e) demonstration of efforts made to select portions of the work for performance by LBE firms in order to increase the likelihood of achieving the stated goal;
 - (f) documented efforts to negotiate with LBE firms for specific subcontracts, including at a minimum:
 - (i) The names, address and telephone numbers of LBE firms that are contacted;
 - (ii) A description of the information provided to LBE firms regarding the plans and specifications for portions of the work to be performed;
 - (iii) Documentation showing that no reasonable price can be obtained from LBE firms;
 - (iv) A statement of why agreements with LBE firms were not reached;
 - (g) a statement of the reason for rejecting any LBE firm which the contractor deemed to be unqualified; and
 - (h) documentation of efforts made to assist the LBE firms contacted that needed assistance in obtaining required insurance.
- (E) Unless otherwise waived by the Commissioner with the approval of the Office of Economic and Financial Opportunity, failure of a proposed contractor to provide the information required by paragraphs (C) and (D) above may render the bid non-responsive and the Contract may not be awarded to the bidder. If the contractor states that it will subcontract a specific portion of the work, but can demonstrate despite good faith efforts it cannot achieve its required LBE percentage for subcontracted work until after award of Contract, the Contract may be awarded, subject to a letter of compliance from the contractor stating that it will comply with Administrative Code Section 6-108.1 and subject to approval by the Commissioner. If the contractor has not met its required LBE percentage prior to award, the contractor shall demonstrate that a good faith effort has been made subsequent to award to obtain LBEs on each subcontract until it meets the required percentage.
- (F) When a bidder indicates prior to award that no work will be subcontracted, no work may be subcontracted without the prior written approval of the Commissioner, which shall be granted only if the contractor in good faith seeks LBE subcontractors at least six weeks prior to the start of work.
- (G) The contractor may not substitute or change any LBE which was identified prior to award of the contract without the written permission of the Commissioner. The contractor shall make a written application to the Commissioner for permission to make such substitution or change, explaining why the contractor needs to change its LBE subcontractor and how the contractor will meet its LBE subcontracting requirement. Copies of such application must be served on the originally identified LBE by certified mail return receipt requested,

as well as the proposed substitute LBE. The Commissioner shall determine whether or not to grant the contractor's request for substitution.

38. Bid Submission Requirements

The Bid Submission Requirements are set forth in the PASSPort RFx.

39. Comptroller's Certificate

This Contract shall not be binding or of any force unless it is registered by the Comptroller in accordance with Section 328 of the City Charter and the Procurement Policy Board Rules. This Contract shall continue in force only after annual appropriation of funds by the City of New York and certification as hereinabove set forth.

40. Procurement Policy Board Rules

This Invitation For Bids is subject to the Rules of the Procurement Policy Board of the City of New York. In the event of a conflict between said Rules and a provision of this Invitation For Bids, the Rules shall take precedence.

41. DDC Safety Requirements

The DDC Safety Requirements apply to the work to be performed pursuant to the Contract. The DDC Safety Requirements are set forth on the following pages.

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CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
SAFETY REQUIREMENTS FOR CONSTRUCTION
CONTRACTS

January 2020

THE DDC SAFETY REQUIREMENTS FOR CONSTRUCTION CONTRACTS INCLUDE THE FOLLOWING SECTIONS:

- I. POLICY ON SITE SAFETY**
- II. PURPOSE**
- III. DEFINITIONS**
- IV. RESPONSIBILITIES**
- V. SAFETY QUESTIONNAIRE**
- VI. SITE SAFETY PLAN**
- VII. KICK-OFF/PRE-CONSTRUCTION MEETINGS AND SAFETY REVIEW**
- VIII. EVALUATION DURING WORK IN PROGRESS**
- IX. SAFETY PERFORMANCE EVALUATION**

I. POLICY ON SITE SAFETY

The City of New York Department of Design and Construction (DDC) is committed to a policy of injury and illness prevention and risk management for construction work that will ensure the safety and health of the workers engaged in the projects and the protection of the general public. Therefore, it is DDC's policy that work carried out by Contractors on DDC contracts must, at a minimum, comply with the most current versions of all applicable federal, state and city laws, rules, and regulations, including without limitation:

- ❑ Code of Federal Regulations, Title 29, Part 1926 (29 CFR 1926) and applicable Sub-parts of Part 1910 – U.S. Occupational Safety and Health Administration (OSHA);
- ❑ Federal Highway Administration – Manual on Uniform Traffic Control Devices (MUTCD);
- ❑ New York Codes, Rules and Regulations (NYCRR), Title 12, Part 23 – Protection in Construction, Demolition and Excavation Operations;
- ❑ New York Codes, Rules and Regulations (NYCRR), Title 16, Part 753 – Protection of Underground Facilities;
- ❑ New York City Administrative Code, Title 28 – New York City Construction Codes;
- ❑ Rules of the City of New York, Title 15, Chapter 13 – Rules Pertaining To the Prevention of the Emission of Dust from Construction Related Activities;
- ❑ Rules of the City of New York, Title 15, Chapter 28 – Citywide Construction Noise Mitigation;
- ❑ Rules of the City of New York, Title 34 Chapter 2 – NYCDOT Highway Rules.

The Contractor will be required to comply with all new and/or revised federal, state and city laws, rules, and regulations, issued during the course of the project, at the expense of the Contractor without any additional costs to the DDC.

II. PURPOSE

The purpose of this policy is to ensure that Contractors perform their work and supervise their employees in accordance with all applicable federal, state and city rules and regulations. Further, Contractors will be expected to minimize or eliminate jobsite and public hazards, through a planning, inspection, auditing and corrective action process. The goal is to control risks so that injuries, illnesses, and accidents to contractors' employees, DDC employees and the general public, as well as damage to city-owned and private property, are reduced to the lowest level feasible.

III. DEFINITIONS

Agency Chief Contracting Officer (ACCO): The ACCO will mean the person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the City Chief Procurement Officer (CCPO).

Competent Person: As defined by OSHA, an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees or the general public, and who has authorization to take prompt corrective measures to eliminate them. This individual will have completed, at a minimum an authorized 30-hour OSHA Construction Safety Course. The Contractor may be required to provide more than one competent person due to construction operations and based on the number of active work sites.

Construction Safety Auditor: A representative of the Office of Construction Safety who provides inspection and assessment services to enhance health and safety on all DDC construction projects. The activities of the Construction Safety Auditor include performing site audits, reviewing safety plans, reviewing construction permits, drawings, verifying Contractor's compliance with applicable federal, state and city laws, rules, regulations, and DDC Contract Safety Requirements, etc. and rendering technical advice and assistance to DDC Resident Engineers and Project Managers.

Office of Construction Safety: A unit of DDC Safety and Site Support that assesses contractor’s safety on DDC jobsites and advises responsible parties of needed corrective actions.

Registered Construction Superintendent: For certain projects, as defined in New York City Construction Codes – Title 28, the contractor will provide a Construction Superintendent registered with the NYC Department of Buildings and responsible for all duties as defined in Chapter 33 of Title 1 of the Rules of the City of New York.

Contractor: For purposes of these Safety Requirements, the term “Contractor” will mean any person or entity that enters into a contract for the performance of construction work on a DDC project. The term “Contractor” will include any person or entity which enters into any of the following types of contracts: (1) a prime construction contract for a specific project, (2) a prime construction contract using the Job Order Contracting System (“JOCS Contract”), and (3) a subcontract with a CM/Builder (“First Tier Subcontract”).

Daily Safety Job Briefing: Daily jobsite safety briefings, given to all jobsite personnel at project site by the Contractor before work begins and/or if hazards or potential hazards are discovered while working, with the purpose of discussing the scheduled activities for the day, the hazards related to these activities, activity specific safety procedures, and Job Hazard Analysis associated with the scheduled construction work. Daily jobsite briefings will be documented, available at the jobsite, and will include at a minimum, topics, name and signature of the person conducting the briefing session, names and signatures of attendants, name of the designated competent person, contactor’s name, DDC Project ID, date, time, and location.

Director – Office of Construction Safety: Responsible for the operations of the Office of Construction Safety and the DDC Site Safety management programs.

Job Hazard Analysis (JHA): A process of identifying the major job tasks and any potential site-specific hazards that may be present during construction and establishing the means and methods to eliminate or control those hazards. A JHA will be documented, available at the jobsite and will include at a minimum work tasks, being performed, identified hazards, control methods for the identified hazards, contractor’s name, DDC Project ID, location, date, name and signature of certifying person. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop and will be present at the worksite and produced upon request.

Qualified Person: As defined by OSHA, an individual who, by possession of a recognized degree, certificate, license, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve problems relating to the subject matter, the work, or the project. Qualified Persons are required under regulation to address issues pertaining, but without limit, to fall protection, scaffold design, maintenance and protection of traffic, and excavation protective system, among others.

Project Site: Those areas indicated in the Contract Documents where the Work is to be performed.

Project Safety Representative: The designated Project Safety Representative will have at a minimum an OSHA 30-hour Construction Safety Course and other safety training applicable to Contractor’s/subcontractor’s project work. This individual will be responsible to oversee safety performance of the required construction work, conduct documented daily safety inspections, and implement corrective actions to maintain a safe work site. The Project Safety Representative must have sufficient experience and skills necessary to thoroughly understand the health and safety hazards and controls and must have authority to undertake corrective actions. A dedicated full-time Project Safety Representative may be required on large projects and projects deemed by DDC to be particularly high risk. DDC reserves the right to request a dedicated full-time Project Safety Representative for any reason at any time during the course of the project at the expense of the Contractor without any additional costs to the DDC. The full-time Project Safety Representative will be present at the site during all work activities.

Resident Engineer (“RE”): Representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the work. The RE may be a consultant retained by DDC, including a Construction Management (CM) or Resident Engineer Inspection (REI) firm. If DDC has retained a CM, REI or other consultant firm to perform management and oversight for the Project (e.g., CM-Builder, CM-Design-Builder, Project Manager, Program Manager), that CM, REI or other consultant is the Resident Engineer for purposes of these Safety Requirements.

Safety Questionnaire: Used by DDC to evaluate Contractor’s current and past safety performance. It is required to be completed by all Contractors initially when submitting bids for Construction work, or when being pre-qualified and updated annually or as requested by the DDC.

Site Safety Manager: For certain projects, as defined in New York City Construction Codes – Title 28, the Contractor will provide a Site Safety Manager with a Site Safety Manager License issued by the New York City Department of Building.

Site Safety Plan: A site-specific safety plan developed by the Contractor for a DDC project. The Site Safety Plan will identify the project work scope, identify hazards associated with the project work and include project specific safety procedures and training appropriate and necessary to complete the work. The Site Safety Plan will be submitted within 30 days from the Award Date or as otherwise directed and is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site.

Unsafe or Unhealthy Condition: A condition that could be potentially hazardous to the health and safety of personnel or the public, and/or damaging to equipment, machinery, property, or the environment.

Weekly Safety Meetings: Weekly jobsite safety meetings, given to all jobsite personnel by Contractor, with the purpose of discussing general safety topics and job specific requirements encountered at the DDC work site. Weekly safety meetings will be documented and will include at a minimum, topics, name and signature of the person conducting the meeting, names and signatures of attendees, contractor’s name, DDC Project ID, date, and location.

Work: The construction required by the Contractor’s Contract Documents whether completed or partially completed, performed by the Contractor/ subcontractors. Work refers to the furnishing of labor, furnishing and incorporating materials and equipment into the construction and providing any service required by the Contract Documents to fulfill the Contractor’s obligation to complete the Project. For the purposes of these Safety Requirements, the term “Work” includes all Utility Interference work (commonly referred to as “Section U”, “EP-7”, and “Joint Bid” work) performed in association with this Contract.

IV. RESPONSIBILITIES

All persons who manage, perform, and provide support for construction projects will conduct operations in compliance with the requirements identified in this Policy and all applicable governing regulatory agency requirements and guidelines pertaining to safety in construction.

A. Resident Engineer

1. Review and facilitate Contractor(s) Site Safety Plan submittals to DDC for acceptability.
2. Notify the Office of Construction Safety of the commencement of construction work.
3. Develop and implement a training verification process to ensure that all CM/REI, consultant, Contractor, and subcontractor employees are properly trained. Maintain all applicable initial and refresher training records and assures documentation availability on site.
4. Maintain documentation of and attend weekly safety meetings and daily safety job briefings.
5. Assure that Contractor(s) JHA’s are current to reflect the work tasks being performed, hazards, and control methods to mitigate the identified hazards. Verify that all employees at the job site are trained on the JHAs and maintain supporting documentation on site.
6. Assure adequate planning for all critical construction activities (crane operation, excavation, confined space entry, etc.) including coordination between Contractor(s) /DDC/ other Agencies as required.
7. Maintain custody of all construction related permits, plans, approvals, drawings, etc., related to the project and assure their availability on site.
8. Recognize, minimize, or eliminate jobsite and public hazards, through required planning, inspection, verification, and corrective action process.
9. Monitor the conditions at the site for conformance with the Contractor’s Site Safety Plan, DDC policies, permits, and all applicable regulations and documentation that pertain to construction safety.
10. Notify the Contractor and DDC immediately upon determination of any condition or activity existing which is not in compliance with the Contractor’s Site Safety Plan, applicable federal, state or local codes or any

condition that presents a potential risk of injury to the public or workers or possible damage to property. Direct the Contractor to provide such labor, materials, equipment, and supervision to remedy such conditions.

11. Notify the Office of Construction Safety and the ACCO's Insurance and Risk Management Unit of project-related accidents, incidents, and near misses as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure within two (2) hours.
12. In case of an accident, incident, or near miss, RE is responsible to protect the integrity of the accident site including but not limited to: the safeguarding of all evidence, documentation of all personnel on site at the time of the accident, gather facts related to all accidents, incidents, or near miss, and prepare required DDC Construction Accident Report as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure. Maintain all records pertaining to accidents, incidents, and near miss and have them available upon request.
13. Notify the Office of Construction Safety within two (2) hours of the start of an inspection by any outside/regulatory agency personnel, including NYS, OSHA, NYC DOB or any other City/State/Federal oversight entity and forward a copy of the inspection report within one business day of its receipt.
14. Escort and assist Construction Safety Auditors during all field and record audits.
15. Report any emergency conditions to the Office of Construction Safety immediately.

Note: In addition to the responsibilities listed above, if the Resident Engineer is a CM/REI or other non-City party hired by the City to manage the Project, the Resident Engineer is also required to do the following:

16. Provide personnel who are certified and or trained appropriately for the requirements of the project.
17. Perform an investigation for any project-related accidents, incidents, and near misses. Within 24-hours of the time of the accident, incident, or near miss, the CM/REI will submit an investigation report to the Office of Construction Safety. Such report will include proposed remedial measures and implementation of corrective actions to prevent recurrence.

DDC reserves the right to request that the CM/REI replace any CM/REI personnel for any reason at any time during the project.

B. Construction Contractors

Note: For CM-Build and CM-Design-Build Projects, the CM will meet all requirements listed in this section, as well as the Resident Engineer section above.

1. Submit a completed Safety Questionnaire and other safety performance related documentation with its bid or as part of a pre-qualification package.
2. Submit a Site Safety Plan within 30 days from the Award Date or as otherwise directed. The Site Safety Plan is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site. The Site Safety Plan will be revised and updated as necessary during the course of the project. If requested by the Office of Construction Safety, the Site Safety Plan must be developed and submitted for approval using a web-based system, the Site Safety Plan Application (SSP App).
3. Designate and identify a Project Safety Representative in the Site Safety Plan. The Contractor will immediately notify the Office of Construction Safety, in a form and manner acceptable to the Office of Construction Safety, of any permanent change to the designated Project Safety Representative. In the event the primary designated Project Safety Representative is temporary unable to perform his or her duties, an alternate Project Safety Representative will be provided. Resumes, outlining the qualification and experience for the Project Safety Representative (s) will be included in the Site Safety Plan and available upon request. DDC reserves the right to request the Contractor to replace a Project Safety Representative for any reason at any time during the course of the project.
4. Designate and identify a Competent Person(s) in the Site Safety Plan. Contractor/subcontractor may be required to provide more than one competent person due to construction operations and based on a number of work tasks/areas. DDC reserves the right to request the Contractor to replace a Competent Person or provide additional Competent Person(s) for any reason at any time during the course of the project. The Competent Person will be present at the site during all work activities.
5. For certain projects, as defined in New York City Construction Codes – Title 28, designate and identify the Licensed Site Safety Manager or Registered Construction Superintendent. Resumes, outlining the qualification and experience for the Licensed Site Safety Manager or Registered Construction Superintendent will be included in the Site Safety Plan and available upon request. The Contractor will immediately notify the Office

of Construction Safety, in a form and manner acceptable to the Office of Construction Safety, of any permanent change to the designated Site Safety Manager and/or Construction Superintendent. In the event the primary designated Site Safety Manager or Construction Superintendent is temporarily unable to perform his or her duties, an alternate Licensed Site Safety Manager and/or Registered Construction Superintendent will be provided. The Office of Construction Safety must be informed of such change. DDC reserves the right to request the Contractor to replace Site Safety Manager or Construction Superintendent for any reason at any time during the course of the project.

6. Develop a written Job Hazard Analysis (JHA) that identifies safety hazards and control methods for project specific work tasks. A preliminary JHA will be included in the Site Safety Plan submitted by the Contractor. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop during the course of the project and will be present at the worksite and produced upon request.
7. Develop project specific safety procedures to protect employees, general public, and property during all construction activities for the duration of the project.
8. Ensure that all employees are aware of the hazards associated with the project through documented formal and informal training and/or other communications. Conduct and document new employee and site-specific safety orientation for all Contractor and subcontractor personnel to review the hazards associated with the project as identified in the Site Safety Plan and the specific safety procedures and controls that will be used to protect workers, the general public and property. The Project Safety Representative will conduct this training prior to mobilization and if necessary during the course of the project. Documentation will be provided to the RE.
9. Prior to performing any work on DDC projects all Contractor's and subcontractor's employees will, at a minimum, have successfully completed, within the previous five calendar years, an OSHA 10-hour construction safety course.

All training records (OSHA 10-hour, flagger, scaffold, fall protection, confined space, etc.) will be provided to the RE prior to mobilization, included in the Site Safety Plan, kept current during the course of the project, and available for review.

10. Conduct and document weekly safety meetings and daily job briefing sessions for the duration of the project. Attendance at weekly safety meetings and daily job briefing sessions is mandatory. A written record of weekly safety meetings will be available upon request and job briefing sessions will be available at the worksite.
11. As part of the Site Safety Plan, prepare site specific procedures, such as maintenance and protection of traffic plan, steel erection plan, confined space program, fall protection plan, demolition plan, site specific emergency evacuation plan, etc. (if not otherwise provided in the contract documents) and comply with all of its provisions.
12. Have immediately available for review at the project site where actual construction activities are being performed all applicable documentation, including but not limited to: JHAs for work tasks being performed, all required training records, MPT plan (where applicable), Noise and Dust Mitigation Plans, excavation protective system drawings (where applicable), Emergency Evacuation plan, fall protection program (where applicable), confined space program (where applicable), all required permits, daily job briefing records, all required documentation for crane operation (where applicable), daily inspection checklist, scaffold and sidewalk drawings (when applicable), safety data sheets for chemicals in use.
13. Comply with all federal, state and local safety and health rules, laws, and regulations.
14. Comply with all provisions of the Site Safety Plan.
15. Provide, replace, and adequately maintain at or around the project site, suitable and sufficient signage, lights, barricades and enclosures (fences, sidewalk sheds, netting, bracing, etc.). The project specific MPT plan will be developed, implemented, and reviewed during the course of the project.
16. The Project Safety Representative will conduct daily safety inspections, document the inspection results, implement corrective actions for the identified hazards. Maintain the inspection records and have them available upon request.
17. **Report unsafe or unhealthy conditions to the RE as soon as practical, but no more than 24 hours after discovery, and take prompt actions to remove or abate such conditions. Should an imminent dangerous condition be discovered, Contractor will stop all work in the area of danger until corrections are made.**
18. Report all accidents, incidents and near misses involving injuries to workers or the general public, as well as property damage, to the RE within one (1) hour.
19. Following an accident or incident, unless otherwise directed, the Contractor will not remove or alter any equipment, structure, material, or evidence related to the accident or incident. Exception: Immediate emergency procedures taken to secure structures, temporary construction, operations, or equipment that pose a continued imminent danger or facilitate assistance for persons who are trapped or who have sustained bodily injury. Take

additional measures as necessary to secure the accident or incident site and to protect against any further injury or property damage.

20. The Contractor will perform an investigation into the root cause of the accident, incident, or near miss. Within 24 hours of an accident, incident, or near miss, the Contractor will prepare and submit to the RE a written investigation report detailing findings, corrective actions, and hazard mitigation implementation to prevent recurrence.
21. Notify the RE within two (2) hours of the start of an inspection by any outside regulatory agency personnel, including OSHA, NYC DOB, or others.
22. Maintain all records pertaining to all required safety compliance documents, accidents and incidents reports. DDC reserves the right to request copy of any records pertaining to the safety of the project and required by DDC and other federal, state, and city agencies, including but not limited to permits, training records, safety inspection records, drawings, equipment records, etc.
23. Cooperate with DDC Office of Construction Safety/ RE and address DDC recommendations on safety, which will in no way relieve the Contractor of its responsibilities for safety on the project. The Contractor has sole responsibility for safety.

V. SAFETY QUESTIONNAIRE

DDC requires that all Contractors provide information regarding their current and past safety performance and programs. This will be accomplished by the use of the DDC Safety Questionnaire. As a part of the bid submittal package, the contractor will submit a completed DDC Safety Questionnaire listing company workers' compensation experience modification rating and OSHA Incident Rates for the three (3) years prior to the date of the bid opening. DDC may request a Contractor to update its Questionnaire at any time or to provide more detailed information. The Contractor will provide the requested information within 15 days.

The following criteria will be used by DDC in reviewing the Contractor's responsibility, which will be based on the information provided on the questionnaire:

- Criteria 1: OSHA Injury and Illness Rates (I&IR) are no greater than the average for the industry (based on the most current Bureau of Labor Statistics data for the Contractors SIC code); and
- Criteria 2: Insurance workers compensation Experience Modification Rate (EMR) equal to or less than 1.0; and
- Criteria 3: Any willful violations issued by OSHA or NYC DOB within the last three (3) years; and
- Criteria 4: A fatality (worker or member of public) and injuries, requiring OSHA notification, experienced on or near Contractor's worksite within the last three (3) years; and
- Criteria 5: Past safety performance on DDC projects (accidents; status of site safety plan submittals; etc.)
- Criteria 6: OSHA violation history for the last three (3) years;
- Criteria 7: Contractor will provide OSHA Injury and Illness Records (currently OSHA 300 and 300A Logs) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Office of Construction Safety may request, through the ACCO, more details concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, accident investigation reports, OSHA records, OSHA and NYC DOB citations, EPA citations and written corrective action plan.

VI. SITE SAFETY PLAN

Within thirty (30) days from the Award Date or as otherwise directed, the Contractor will submit the Site Safety Plan. The Site Safety Plan will identify project work scope, safety hazards associated with the project tasks, and include specific safety procedures and training appropriate and necessary to complete the work. The Site Safety Plan is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site. Due to the project work scope and project duration, the Office of Construction Safety may grant a conditional acceptance for a Site Safety Plan without all sections being complete. In a case of a "Conditional Acceptance" of a Site Safety Plan,

the Contractor will provide the remaining sections previously incomplete and/or not submitted for review and acceptance by the Office of Construction Safety prior to the commencement of the construction activities. The Office of Construction Safety reserves the right to withdraw the initial “Conditional Acceptance” if the Contractor fails to provide the remaining sections of a Site Safety Plan. Failure by the Contractor to submit an acceptable Site Safety Plan will be grounds for default.

Site Safety Plan requirements: The Site Safety Plan will be a written document and will apply to all project specific Contractor and subcontractor operations, and will have at a minimum, the following elements with each described in a separate section (It may be necessary to modify the basic format for certain unique or high-risk projects, such as tunnels or high-rise construction). All Site Safety Plan sections will be numbered in the order listed below. For sections, which are not applicable for the type of the work being performed by the Contractor on DDC project, the Contractor will in writing indicate “Not applicable based on the project work scope.” The Site Safety Plan will include Contractor’s name, DDC project ID, project location (s), and development and revision dates. The Site Safety Plan will include the sections, attachments, and appendixes provided in the Site Safety Plan. All pages of the Site Safety Plan will be numbered. If requested by the Office of Construction Safety, the Site Safety Plan must be developed and submitted for approval using a web-based system, the Site Safety Plan Application (SSP App).

1. Project Work Scope – Detailed information regarding work tasks that will be performed by Contractor and subcontractors under the project.
2. Responsibility and Organization – Contractor’s organization chart with responsible personnel for the project, including titles, names, contact information, roles, and responsibilities. All Contractor’s personnel required by the DDC Safety Requirements will be identified.
3. Safety Training and Education – OSHA 10 Hours training, requirements for daily safety briefings and weekly safety meetings, any work task specific training, responsible staff for implementation of training program for the project.
4. Job Hazard Analysis (JHA) – Project specific Job Hazard Analysis including work tasks, identified hazards, hazard control methods (administrative, engineering, PPE) to protect workers, property and general public, Contractor’s name, project id, location, name and signature of a certifying person, hazard assessment date.
5. Protection of Public – Project specific procedures covering safety of the general public during all project construction activities.
6. Hazard Corrective Actions - Procedures for hazard identification, including responsible person(s), frequency of safety inspections, implementation of corrective actions, safety inspection checklist.
7. Accident/Exposure Investigation – Project specific procedures for accident/incident/near miss investigation and implementation of corrective actions. Accident/incident/near miss notification procedure of DDC project staff (timer frame and responsible personnel).
8. Recording and Reporting Injuries – Procedures to meet 29 CFR 1904 requirements.
9. First Aid and Medical Attention – Responsible staff, location and inspection of First Aid kit, directions to local hospitals; emergency telephone numbers.
10. Project Specific Fire Protection and Prevention Program – Project specific procedures, including responsible staff, fire alarm system/methods, hot work procedures, etc.
11. Housekeeping Procedure.
12. Project Specific Illumination Procedure.
13. Project Specific Sanitation Procedure.
14. Personal Protective Equipment (PPE), including Respiratory Protection Program and Hearing Conservation Program, if required.
15. Hazard Communication Program – Contractor’s Hazard Communication Program, responsible staff; training; SDS records, project specific list of chemicals; location of the program and SDS records.
16. Means of Egress – Information regarding free and unobstructed egress from all parts of the building or structure; exit marking; maintenance of means of egress, etc.
17. Employee Emergency Action Plan – Project specific: responsible staff, emergency alarm system/devices, evacuation procedure, procedure to account for employees after evacuation, etc.
18. Evacuation Plan – Project specific evacuation plan (drawing/scheme) with exists and evacuation routes.
19. Ionizing/Nonionizing Radiation – Competent person, license and qualification requirements, type of radiation, employee’s exposure and protection, safety procedures, etc.

20. Material Handling, Storage, Use and Disposal – Project specific information regarding material storage, disposal, and handling: procedures, plan/drawings, etc.
21. Signs, Signals, and Barricades – Use of danger/warning signs, safety instruction signs, sidewalk closure and pedestrian fencing and barricades (if not included in the MPT plan), etc.
22. Tools – Hand and Power – Safety procedures for the type of tools to be used.
23. Scaffold – Project specific scaffold types, procedures, training requirements, scaffold drawings, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed; competent person, criteria for project specific scaffold, falling object protection, procedures for aerial lifts/scissor lifts.
24. Welding and Cutting – Project specific procedure for welding and cutting, including all necessary safety requirements such as fire prevention, personal protective equipment, hot work permits (if not covered by Contractor’s Fire Prevention and Protection program, FDNY certificate requirements).
25. Electrical Safety – Project specific procedures, including lock out-tag out.
26. Fall Protection – Project specific information regarding selected fall protection systems, fall protection plan, responsible staff.
27. Cranes, Derrick, Hoists, Elevators, Conveyors – project specific equipment information including type, rated load capacity, manufacture specification requirements, competent person, exposure to falling load, inspection, recordkeeping, clearance requirements, communication procedure, ground lines, permits.
28. Excavation Safety – Competent person; excavation procedures; project specific protective system, including drawings, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed.
29. Protection of Underground Facilities and Utilities Procedure, including responsible staff and responsibilities.
30. Concrete and Masonry Construction Procedures
31. Maintenance and Protection of Traffic Plan – Project specific MPT plan, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed; flagmen training, public safety, etc.
32. Steel Erection – Site specific erection plan, requirements for applicable written notifications, competent person, fall protection plan, training requirements, etc.
33. Demolition – Engineering survey, including written evidence, disconnection of all effected utilities, identification of all hazardous chemicals, materials, gases, etc., floor openings, chutes, inspection and maintenance of all stairs/passageways, removal of materials/debris/structural elements, lock out/tag out, competent person.
34. Blasting and the Use of Explosives – Project specific safety procedures, warning signs, training/qualification, transportation, storage and use of explosives, inspection.
35. Stairways and Ladders – Types of stairs and ladders, safety procedures, training requirements.
36. Alcohol and Drug Abuse Policy
37. Rodents and Vermin Controls
38. Toxic and Hazardous Substances – Safety procedures for substances that Contractor’s and subcontractor’s employees can be exposed on project.
39. Noise Mitigation Plan – Completed project specific Noise Mitigation Plan, and noise mitigation procedures.
40. Confined Space Program – Project specific Confined Space Program, responsible staff, training records, equipment information, rescue procedure, list of project specific confined spaces, forms.
41. Construction Vehicles/Heavy Equipment – Type of construction vehicles/heavy equipment to be used on site, procedures
42. Dust Mitigation Plan – Completed project specific Dust Mitigation Plan, and dust mitigation procedures.
43. Working Over and Near Water. Diving Operations – safety procedures including personal protective equipment, fall protection, rescue services, etc.

The most critical component of the Site Safety Plan is the Job Hazard Analysis (JHA) section. The JHA form is a written document prepared by the Contractor. The Contractor will conduct a site and task assessment to identify the tasks and any potential safety or environmental hazards related to performance of the work, eliminate or implement controls for the potential hazards, and identify proper personal protective equipment for the task. The JHA will be communicated to all Contractor/subcontractor personnel on site. The JHA will include safety hazard identification and controls to protect employees, general public, and property.

The initial JHA will be included in the Contractor’s Site Safety Plan and the current JHA form will be available at the construction site for reference. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop and will be present at the worksite and produced upon request.

VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW

Prior to the start of construction activities on all DDC projects, RE will invite the Office of Construction Safety to the construction kick-off meeting. The Office of Construction Safety representative(s) will participate in this meeting with the Contractor and RE for the purpose of:

- A. Reviewing DDC Contract Safety Requirements
- B. Reviewing site-specific safety issues based on a project work scope, location, and any other factors which may impact safety of workers and general public.
- C. Reviewing the Site Safety Plan and JHA requirements.
- D. Reviewing Accident/Incident reporting and investigation procedures.
- E. Reviewing designated safety contacts, roles, and responsibilities.
- F. Discussing planned inspections and audits of the site by the Office of Construction Safety personnel.

VIII. EVALUATION DURING WORK IN PROGRESS

The Contractor's adherence to these Safety Requirements will be monitored throughout the project. This will be accomplished by the following:

- A. Use of a safety checklist by a representative of the Office of Construction Safety (or other designated DDC representative) and the RE during regular inspections and comprehensive audits of the job site. Field Exit Conferences will be held with the RE and Contractor Project Safety Representatives.
- B. The RE will continually monitor the safety and environmental performance of the Contractor's employees and work methods. Deficiencies will be brought to the attention of the Contractor's Project Safety Representative on site for immediate correction. The RE will maintain a written record of these deficiencies and have these records available upon request. Any critical deficiencies will be immediately reported to the Office of Construction Safety via telephone (718)391-1911.
- C. If the Contractor's safety performance during the project is not up to DDC standards (safety performance measure, accident/incident rate, etc.) the Director – Office of Construction Safety, or his/her designee will meet with the Contractor's Project Safety Representative and other representatives, the RE, and the DDC Environmental Specialist (if environmental issues are involved). The purpose of this meeting is to 1) determine the level of non-compliance; 2) explain and clarify the safety/environmental provisions; 3) agree on a future course of action to correct the deficiencies.
- D. If the deficiencies continue, the Commissioner may, without limitation, declare the Contractor in default.
- E. The Contractor will within 1 hour inform the RE of all accidents/incidents/near misses including all fatalities, any injuries to employees or members of the general public, and property damage (e.g., structural damage, equipment rollovers, utility damage, loads dropped from crane). The RE will notify the Office of Construction Safety as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure and will maintain a record of all Contractor accidents/incidents for the project.
- F. The Contractor and the RE will notify the Office of Construction Safety within two (2) hours of the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections.

IX. SAFETY PERFORMANCE EVALUATION

The Contractor's safety record, including accident/incident history and DDC safety inspection results, will be considered as part of the Contractor's performance evaluation at the conclusion of the project. Poor safety performance during the course of the project will be a reason to rate a Contractor unsatisfactory which may be reflected in the City's PASSPort system and will be considered for future procurement actions as set forth in the City's Procurement Policy Board Rules.

NOTICE TO BIDDERS

Please be advised that the following Riders to the March 2017 New York City Standard Construction Contract have been attached and incorporated in this Invitation for Bid:

- Rider regarding Non-Compensable Delays and Grounds for Extension;
- Rider regarding NYC Earned Safe and Sick Time Act.

Other than provisions specifically delineated in the Riders, all other terms of the March 2017 New York City Standard Construction Contract continue to apply in full force and effect.

**RIDER TO NEW YORK CITY STANDARD CONSTRUCTION CONTRACT (MARCH
2017) REGARDING NON-COMPENSABLE DELAYS AND GROUNDS FOR
EXTENSION**

The following provisions supersede the corresponding provisions in the March 2017 version of the New York City Standard Construction Contract:

1. Section **11.5.1** provides as follows:

11.5.1 The acts or omissions of public or government bodies (other than **City** agencies) or of any third parties who are disclosed in the **Contract Documents**, or those third parties who are ordinarily encountered or who are generally recognized as related to the **Work**, including but not limited to, **Other Contractors**, utilities or private enterprises;

2. Section **11.5.6** provides as follows:

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God; acts of war or of the public enemy or terrorist acts; disruption, outage or power failure caused by a utility's inability or failure to provide service, pandemics, epidemics, outbreaks of infectious disease or any other public health emergency; other states of emergency declared by the City, State or Federal government, quarantine restrictions, and freight embargoes; including the **City's** reasonable responses to any of the above; and

3. Section **13.3** provides as follows:

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By any of the acts or omissions of the **City**, its officials, agents or employees set forth in Articles **11.4.1.1** through **11.4.1.9**; or

13.3.2 By or attributable to any of the items set forth in Articles **11.5.1** through **11.5.7**.

13.3.3 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

NYC EARNED SAFE AND SICK TIME ACT CONTRACT RIDER

(To supersede Section 4.06 of the January 2018 Appendix A and Section 35.5 of the March 2017 Standard Construction Contract and to be attached to other City contracts and solicitations)

A. *Introduction and General Provisions.*

1. The Earned Safe and Sick Time Act (“ESSTA”), codified at Title 20, Chapter 8 of the New York City Administrative Code, also known as the “Paid Safe and Sick Leave Law,” requires covered employees (as defined in Admin. Code § 20-912) in New York City (“City”) to be provided with paid safe and sick time. Contractors of the City or of other governmental entities may be required to provide safe and sick time pursuant to the ESSTA. The ESSTA is enforced by the City’s Department of Consumer and Worker Protection (“DCWP”), which has promulgated 6 RCNY §§ 7-101 and 201 *et seq.* (“DCWP Rules”).

2. The Contractor agrees to comply in all respects with the ESSTA and the DCWP Rules, and as amended, if applicable, in the performance of this agreement. The Contractor further acknowledges that such compliance is a material term of this agreement and that failure to comply with the ESSTA in performance of this agreement may result in its termination.

3. The Contractor must notify (with a copy to DCWP at ComplianceMonitoring@dcwp.nyc.gov) the Agency Chief Contracting Officer of the City Agency or other entity with whom it is contracting in writing within 10 days of receipt of a complaint (whether oral or written) or notice of investigation regarding the ESSTA involving the performance of this agreement. Additionally, the Contractor must cooperate with DCWP’s guidance and must comply with DCWP’s subpoenas, requests for information, and other document demands as set forth in the ESSTA and the DCWP Rules. More information is available at <https://www1.nyc.gov/site/dca/about/paid-sick-leave-what-employers-need-to-know.page>.

4. Upon conclusion of a DCWP investigation, Contractor will receive a findings letter detailing any employee relief and civil penalties owed. Pursuant to the findings, Contractor will have the opportunity to settle any violations and cure the breach of this agreement caused by failure to comply with the ESSTA either i) without a trial by entering into a consent order or ii) appearing before an impartial judge at the City’s administrative tribunal. In addition to and notwithstanding any other rights and remedies available to the City, non-payment of relief and penalties owed pursuant to a consent order or final adjudication within 30 days of such consent order or final adjudication may result in the termination of this agreement without further opportunity to settle or cure the violations.

5. The ESSTA is briefly summarized below for the convenience of the Contractor. The Contractor is advised to review the ESSTA and the DCWP Rules in their entirety. The Contractor may go to www.nyc.gov/PaidSickLeave for resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the Contractor can get more information about how to comply with the ESSTA and the DCWP Rules. The Contractor acknowledges that it is responsible for compliance with the ESSTA and the DCWP Rules notwithstanding any inconsistent language contained herein.

B. *Pursuant to the ESSTA and DCWP Rules: Applicability, Accrual, and Use.*

1. An employee who works within the City must be provided paid safe and sick time.¹ Employers with one hundred or more employees are required to provide 56 hours of safe and sick time for an employee each calendar year. Employers with fewer than one hundred employees are required to provide 40 hours of sick leave each calendar year. Employers must provide a minimum of one hour of safe and sick time for every 30 hours worked by an employee and compensation for such safe and sick time must be provided at the greater of the employee's regular hourly rate or the minimum wage at the time the paid safe or sick time is taken. Employers are not discouraged or prohibited from providing more generous safe and sick time policies than what the ESSTA requires.

2. Employees have the right to determine how much safe and sick time they will use, provided that an employer may set a reasonable minimum increment for the use of safe and sick time not to exceed four hours per day. For the use of safe time or sick time beyond the set minimum increment, an employer may set fixed periods of up to thirty minutes beyond the minimum increment. In addition, an employee may carry over up to 40 or 56 hours of unused safe and sick time to the following calendar year, provided that no employer is required to carry over unused paid safe and sick time if the employee is paid for such unused safe and sick time and the employer provides the employee with at least the legally required amount of paid safe and sick time for such employee for the immediately subsequent calendar year on the first day of such calendar year.

3. An employee entitled to safe and sick time pursuant to the ESSTA may use safe and sick time for any of the following:

a. such employee's mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee's need for medical diagnosis or preventive medical care;

b. such employee's care of a family member (an employee's child, spouse, domestic partner, parent, sibling, grandchild, or grandparent, the child or parent of an employee's spouse or domestic partner, any other individual related by blood to the employee, and any other individual whose close association with the employee is the equivalent of a family relationship) who has a mental illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;

¹ Pursuant to the ESSTA, if fewer than five employees work for the same employer, and the employer had a net income of less than one million dollars during the previous tax year, such employer has the option of providing such employees uncompensated safe and sick time.

c. closure of such employee's place of business by order of a public official due to a public health emergency;

d. such employee's need to care for a child whose school or childcare provider has been closed due to a public health emergency; or

e. when the employee or a family member has been the victim of a family offense matter, sexual offense, stalking, or human trafficking:

1. to obtain services from a domestic violence shelter, rape crisis center, or other shelter or services program for relief from a family offense matter, sexual offense, stalking, or human trafficking;
2. to participate in safety planning, temporarily or permanently relocate, or take other actions to increase the safety of the employee or employee's family members from future family offense matters, sexual offenses, stalking, or human trafficking;
3. to meet with a civil attorney or other social service provider to obtain information and advice on, and prepare for or participate in any criminal or civil proceeding, including but not limited to, matters related to a family offense matter, sexual offense, stalking, human trafficking, custody, visitation, matrimonial issues, orders of protection, immigration, housing, discrimination in employment, housing or consumer credit;
4. to file a complaint or domestic incident report with law enforcement;
5. to meet with a district attorney's office;
6. to enroll children in a new school; or
7. to take other actions necessary to maintain, improve, or restore the physical, psychological, or economic, health or safety of the employee or the employee's family member or to protect those who associate or work with the employee.

4. An employer must not require an employee, as a condition of taking safe and sick time, to search for a replacement. However, where the employee's need for safe and sick time is foreseeable, an employer may require an employee to provide reasonable notice of the need to use safe and sick time. For an absence of more than three consecutive work days, an employer may require reasonable documentation that the use of safe and sick time was needed for a reason listed in Admin. Code § 20-914; and/or written confirmation that an employee used safe and sick time pursuant to the ESSTA. However, an employer may not require documentation specifying the nature of a medical condition, require disclosure of the details of a medical condition, or require disclosure of the details of a family offense matter, sexual offense, stalking, or human trafficking, as a condition of providing safe and sick time. Health information and information concerning family offenses, sexual offenses, stalking or human trafficking obtained solely due to an

employee's use of safe and sick time pursuant to the ESSTA must be treated by the employer as confidential. An employer must reimburse an employee for all reasonable costs or expenses incurred in obtaining such documentation for the employer.

5. An employer must provide to all employees a written policy explaining its method of calculating sick time, policies regarding the use of safe and sick time (including any permissible discretionary conditions on use), and policies regarding carry-over of unused time at the end of the year, among other topics. It must provide the policy to employees using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny safe and sick time to an employee because of non-compliance with such a policy.

6. An employer must provide a pay statement or other form of written documentation that informs the employee of the amount of safe/sick time accrued and used during the relevant pay period and the total balance of the employee's accrued safe/sick time available for use.

7. Safe and sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the safe and sick time was used.

C. *Exemptions and Exceptions.* Notwithstanding the above, the ESSTA does not apply to any of the following:

1. an independent contractor who does not meet the definition of employee under N.Y. Labor Law § 190(2);

2. an employee covered by a valid collective bargaining agreement, if the provisions of the ESSTA are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the ESSTA for such employee;

3. an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines their own schedule, has the ability to reject or accept any assignment referred to them, and is paid an average hourly wage that is at least four times the federal minimum wage;

4. an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;

5. an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or

6. a participant in a Work Experience Program (WEP) under N.Y. Social Services Law § 336-c.

D. *Retaliation Prohibited.* An employer shall not take any adverse action against an employee that penalizes the employee for, or is reasonably likely to deter the employee from or interfere with the employee exercising or attempting in good faith to exercise any right provided by the ESSTA. In addition, an employer shall not interfere with any investigation, proceeding, or hearing pursuant to the ESSTA.

E. *Notice of Rights.*

1. An employer must provide its employees with written notice of their rights pursuant to the ESSTA. Such notice must be in English and the primary language spoken by an employee, provided that DCWP has made available a translation into such language. Downloadable notices are available on DCWP's website at <https://www1.nyc.gov/site/dca/about/Paid-Safe-Sick-Leave-Notice-of-Employee-Rights.page>. The notice must be provided to the employees by a method that reasonably ensures personal receipt by the employee.

2. Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed \$50.00 for each employee who was not given appropriate notice.

F. *Records.* An employer must retain records documenting its compliance with the ESSTA for a period of at least three years, and must allow DCWP to access such records in furtherance of an investigation related to an alleged violation of the ESSTA.

G. *Enforcement and Penalties.*

1. Upon receiving a complaint alleging a violation of the ESSTA, DCWP must investigate such complaint. DCWP may also open an investigation to determine compliance with the ESSTA on its own initiative. Upon notification of a complaint or an investigation by DCWP, the employer must provide DCWP with a written response and any such other information as DCWP may request. If DCWP believes that a violation of the ESSTA has occurred, it has the right to issue a notice of violation to the employer.

2. DCWP has the power to grant an employee or former employee all appropriate relief as set forth in Admin. Code § 20-924(d). Such relief may include, but is not limited to, treble damages for the wages that should have been paid; statutory damages for unlawful retaliation; and damages, including statutory damages, full compensation for wages and benefits lost, and reinstatement, for unlawful discharge. In addition, DCWP may impose on an employer found to have violated the ESSTA civil penalties not to exceed \$500.00 for a first violation, \$750.00 for a second violation within two years of the first violation, and \$1,000.00 for each succeeding violation within two years of the previous violation. When an employer has a policy or practice of not providing or refusing to allow the use of safe and sick time to its employees, DCWP may seek penalties and relief on a per employee basis.

3. Pursuant to Admin. Code § 20-924.2, (a) where reasonable cause exists to believe that an employer is engaged in a pattern or practice of violations of the ESSTA, the Corporation Counsel may commence a civil action on behalf of the City in a court of competent jurisdiction by filing a complaint setting forth facts relating to such pattern or practice and requesting relief, which may include injunctive relief, civil penalties and any other appropriate relief. Nothing in § 20-924.2 prohibits DCWP from exercising its authority under section 20-924 or the Charter, provided that a civil action pursuant to § 20-924.2 shall not have previously been commenced.

H. *More Generous Policies and Other Legal Requirements.* Nothing in the ESSTA is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous safe and sick time policy, or the obligation of an employer to comply with any contract, collective bargaining agreement, employment benefit plan or other agreement providing more generous safe and sick time. The ESSTA provides minimum requirements pertaining to safe and sick time and does not preempt, limit, or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of safe and sick leave or time, whether paid or unpaid, or that extends other protections to employees. The ESSTA may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule or regulation.

CITY OF NEW YORK

STANDARD CONSTRUCTION CONTRACT

March 2017

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CITY OF NEW YORK STANDARD CONSTRUCTION CONTRACT

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WITNESSETH:

The parties, in consideration of the mutual agreements contained herein, agree as follows:

CHAPTER I: THE CONTRACT AND DEFINITIONS

ARTICLE 1. THE CONTRACT

1.1 Except for titles, subtitles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience), the following, except for such portions thereof as maybe specifically excluded, shall be deemed to be part of this **Contract**:

1.1.1 All provisions required by law to be inserted in this **Contract**, whether actually inserted or not;

1.1.2 The Contract Drawings and Specifications;

1.1.3 The General Conditions and Special Conditions, if any;

1.1.4 The **Contract**;

1.1.5 The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet;

1.1.6 All Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed or the Order to Work.

1.2 Should any conflict occur in or between the Drawings and Specifications, the **Contractor** shall be deemed to have estimated the most expensive way of doing the **Work**, unless the **Contractor** shall have asked for and obtained a decision in writing from the **Commissioner** of the **Agency** that is entering into this **Contract**, before the submission of its bid, as to what shall govern.

ARTICLE 2. DEFINITIONS

2.1 The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless a different meaning is clear from the context:

2.1.1 “**Addendum**” or “**Addenda**” shall mean the additional Contract provisions and/or technical clarifications issued in writing by the Commissioner prior to the receipt of bids.

2.1.2 “**Agency**” shall mean a city, county, borough or other office, position, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid in whole or in part from the City treasury.

2.1.3 “**Agency Chief Contracting Officer**” (**ACCO**) shall mean a person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO, or his/her duly authorized representative.

2.1.4 **“Allowance”** shall mean a sum of money which the Agency may include in the total amount of the Contract for such specific contingencies as the Agency believes may be necessary to complete the Work, *e.g.*, lead or asbestos remediation, and for which the Contractor will be paid on the basis of stipulated unit prices or a formula set forth in the Contract or negotiated between the parties provided, however, that if the Contractor is not directed to use the Allowance, the Contractor shall have no right to such money and it shall be deducted from the total amount of the Contract.

2.1.5 **“City”** shall mean the City of New York.

2.1.6 **“City Chief Procurement Officer” (CCPO)** shall mean a person delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCO and any offices which have oversight responsibility for the procurement of construction, or his/her duly authorized representative.

2.1.7 **“Commissioner”** shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.8 **“Comptroller”** shall mean the Comptroller of the City of New York.

2.1.9 **“Contract”** or **“Contract Documents”** shall mean each of the various parts of the contract referred to in Article 1 hereof, both as a whole and severally.

2.1.10 **“Contract Drawings”** shall mean only those drawings specifically entitled as such and listed in the Specifications or in any Addendum, or any drawings furnished by the Commissioner, pertaining or supplemental thereto.

2.1.11 **“Contract Work”** shall mean everything required to be furnished and done by the Contractor by any one or more of the parts of the Contract referred to in Article 1, except Extra Work as hereinafter defined.

2.1.12 **“Contractor”** shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and its, their, his/her successors, personal representatives, executors, administrators, and assigns, and any person, firm, partnership, joint venture, individual, or corporation which shall at any time be substituted in the place of the Contractor under this Contract.

2.1.13 **“Days”** shall mean calendar days, except where otherwise specified.

2.1.14 **“Engineer”** or **“Architect”** or **“Project Manager”** shall mean the person so designated in writing by the Commissioner in the Notice to Proceed or the Order to Work to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be. Subject to written approval by the Commissioner, the Engineer, Architect or Project Manager may designate an authorized representative.

2.1.15 **“Engineering Audit Officer” (EAO)** shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.16 **“Extra Work”** shall mean Work other than that required by the Contract at the time of award which is authorized by the Commissioner pursuant to Chapter VI of this Contract.

- 2.1.17 **“Federal-Aid Contract”** shall mean a contract in which the United States (federal) Government provides financial funding as so designated in the Information for Bidders.
- 2.1.18 **“Final Acceptance”** shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.
- 2.1.19 **“Final Approved Punch List”** shall mean a list, approved pursuant to Article 14.2.2, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.
- 2.1.20 **“Law” or “Laws”** shall mean the Constitution of the State of New York, the New York City Charter, the New York City Administrative Code, a statute of the United States or of the State of New York, a local law of the City of New York, any ordinance, rule or regulation having the force of law, or common law.
- 2.1.21 **“Materialman”** shall mean any corporation, firm, partnership, joint venture, or individual, other than employees of the Contractor, who or which contracts with the Contractor or any Subcontractor, to fabricate or deliver, or who actually fabricates or delivers, plant, materials or equipment to be incorporated in the Work.
- 2.1.22 **“Means and Methods of Construction”** shall mean the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.
- 2.1.23 **“Notice to Proceed” or “Order to Work”** shall mean the written notice issued by the Commissioner specifying the time for commencement of the Work and the Engineer, Architect or Project Manager.
- 2.1.24 **“Other Contractor(s)”** shall mean any contractor (other than the entity which executed this Contract or its Subcontractors) who or which has a contract with the City for work on or adjacent to the building or Site of the Work.
- 2.1.25 **“Payroll Taxes”** shall mean State Unemployment Insurance (SUI), Federal Unemployment Insurance (FUI), and payments pursuant to the Federal Insurance Contributions Act (FICA).
- 2.1.26 **“Project”** shall mean the public improvement to which this Contract relates.
- 2.1.27 **“Procurement Policy Board” (PPB)** shall mean the Agency of the City of New York whose function is to establish comprehensive and consistent procurement policies and rules which shall have broad application throughout the City.
- 2.1.28 **“Required Quantity”** in a unit price Contract shall mean the actual quantity of any item of Work or materials which is required to be performed or furnished in order to comply with the Contract.
- 2.1.29 **“Resident Engineer”** shall mean the representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the Work.
- 2.1.30 **“Site”** shall mean the area upon or in which the Contractor’s operations are carried on, and such other areas adjacent thereto as may be designated as such by the Engineer.
- 2.1.31 **“Small Tools”** shall mean items that are ordinarily required for a worker’s job

function, including but not limited to, equipment that ordinarily has no licensing, insurance or substantive storage costs associated with it; such as circular and chain saws, impact drills, threaders, benders, wrenches, socket tools, etc.

2.1.32 “**Specifications**” shall mean all of the directions, requirements, and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.33 “**Subcontractor**” shall mean any person, firm or corporation, other than employees of the Contractor, who or which contracts with the Contractor or with its subcontractors to furnish, or actually furnishes labor, or labor and materials, or labor and equipment, or superintendence, supervision and/or management at the Site. Wherever the word Subcontractor appears, it shall also mean sub-Subcontractor.

2.1.34 “**Substantial Completion**” shall mean the written determination by the Engineer that the Work required under this Contract is substantially, but not entirely, complete and the approval of the **Final Approved Punch List**.

2.1.35 “**Work**” shall mean all services required to complete the Project in accordance with the Contract Documents, including without limitation, labor, material, superintendence, management, administration, equipment, and incidentals, and obtaining any and all permits, certifications and licenses as may be necessary and required to complete the Work, and shall include both Contract Work and Extra Work.

CHAPTER II: THE WORK AND ITS PERFORMANCE

ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications, and Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

4.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications, and Addenda**, the **Means and Methods of Construction** shall be such as the **Contractor** may choose; subject, however, to the **Engineer’s** right to reject the **Means and Methods of Construction** proposed by the **Contractor** which in the opinion of the **Engineer**:

4.1.1 Will constitute or create a hazard to the **Work**, or to persons or property; or

4.1.2 Will not produce finished **Work** in accordance with the terms of the **Contract**; or

4.1.3 Will be detrimental to the overall progress of the **Project**.

4.2 The **Engineer’s** approval of the **Contractor’s Means and Methods of Construction**, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the **Contractor** of its obligation to complete the **Work** as provided in this **Contract**; nor shall the exercise of such right to reject

create a cause of action for damages.

ARTICLE 5. COMPLIANCE WITH LAWS

5.1 The **Contractor** shall comply with all **Laws** applicable to this **Contract** and to the **Work** to be done hereunder.

5.2 Procurement Policy Board Rules: This **Contract** is subject to the Rules of the **PPB** (“**PPB Rules**”) in effect at the time of the bid opening for this **Contract**. In the event of a conflict between the **PPB Rules** and a provision of this **Contract**, the **PPB Rules** shall take precedence.

5.3 Noise Control Code provisions.

5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the **City** (“**Administrative Code**”), Noise Abatement Contract Compliance, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this **Contract** and which are subject to the provisions of the **City** Noise Control Code shall be operated, conducted, constructed, or manufactured without causing a violation of the Administrative Code. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise emitted or produced by such devices and activities, in accordance with regulations issued by the **Commissioner** of the **City** Department of Environmental Protection.

5.3.2 The **Contractor** agrees to comply with Section 24-219 of the Administrative Code and implementing rules codified at 15 Rules of the City of New York (“**RCNY**”) Section 28-100 *et seq.* In accordance with such provisions, the **Contractor**, if the **Contractor** is the responsible party under such regulations, shall prepare and post a Construction Noise Mitigation Plan at each **Site**, in which the **Contractor** shall certify that all construction tools and equipment have been maintained so that they operate at normal manufacturers operating specifications. If the **Contractor** cannot make this certification, it must have in place an Alternative Noise Mitigation Plan approved by the **City** Department of Environmental Protection. In addition, the **Contractor**’s certified Construction Noise Mitigation Plan is subject inspection by the **City** Department of Environmental Protection in accordance with Section 28-101 of Title 15 of RCNY. No **Contract Work** may take place at a **Site** unless there is a Construction Noise Mitigation Plan or approved Alternative Noise Mitigation Plan in place. In addition, the **Contractor** shall create and implement a noise mitigation training program. Failure to comply with these requirements may result in fines and other penalties pursuant to the applicable provisions of the Administrative Code and RCNY.

5.4 Ultra Low Sulfur Diesel Fuel: In accordance with the provisions of Section 24-163.3 of the Administrative Code, the **Contractor** specifically agrees as follows:

5.4.1 Definitions. For purposes of this Article 5.4, the following definitions apply:

5.4.1(a) “**Contractor**” means any person or entity that enters into a Public Works Contract with a **City Agency**, or any person or entity that enters into an agreement with such person or entity, to perform work or provide labor or services related to such Public Works Contract.

5.4.1(b) “**Motor Vehicle**” means any self-propelled vehicle designed for transporting

persons or property on a street or highway.

5.4.1(c) “Nonroad Engine” means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.4.1(d) “Nonroad Vehicle” means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this term shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) horsepower or less and that are not used in any construction program or project.

5.4.1(e) “Public Works Contract” means a contract with a **City Agency** for a construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; a contract with a **City Agency** for the preparation for any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; or a contract with a **City Agency** for any final work involved in the completion of any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge.

5.4.1(f) “Ultra Low Sulfur Diesel Fuel” means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.4.2 Ultra Low Sulfur Diesel Fuel

5.4.2(a) All **Contractors** shall use Ultra Low Sulfur Diesel Fuel in diesel-powered Nonroad Vehicles in the performance of this **Contract**.

5.4.2(b) Notwithstanding the requirements of Article 5.4.2(a), **Contractors** may use diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) to fulfill the requirements of this Article 5.4.2, where the Commissioner of the **City Department of Environmental Protection** (“DEP Commissioner”) has issued a determination that a sufficient quantity of Ultra Low Sulfur Diesel Fuel is not available to meet the needs of **Agencies** and **Contractors**. Any such determination shall expire after six (6) months unless renewed.

5.4.2(c) **Contractors** shall not be required to comply with this Article 5.4.2 where the **City Agency** letting this **Contract** makes a written finding, which is approved, in writing, by the DEP Commissioner, that a sufficient quantity of Ultra Low Sulfur Diesel Fuel, or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is not available to meet the requirements of Section 24-163.3 of the Administrative Code, provided that such **Contractor** in its fulfillment of the requirements of this **Contract**, to the extent practicable, shall use whatever quantity of Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per

million (30 ppm) is available. Any finding made pursuant to this Article 5.4.2(c) shall expire after sixty (60) **Days**, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the **City Agency** renews the finding in writing and such renewal is approved by the DEP Commissioner.

5.4.2(d) **Contractors** may check on determinations and approvals issued by the DEP Commissioner pursuant to Section 24-163.3 of the Administrative Code, if any, at www.dep.nyc.gov or by contacting the **City Agency** letting this **Contract**.

5.4.2(e) The requirements of this Article 5.4.2 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.3 Best Available Technology

5.4.3(a) All **Contractors** shall utilize the best available technology for reducing the emission of pollutants for diesel-powered Nonroad Vehicles in the performance of this **Contract**. For determinations of best available technology for each type of diesel-powered Nonroad Vehicle, **Contractors** shall comply with the regulations of the **City Department of Environmental Protection**, as and when adopted, Chapter 14 of Title 15 of the Rules of the City of New York (RCNY). The **Contractor** shall fully document all steps in the best available technology selection process and shall furnish such documentation to the **City Agency** or the DEP Commissioner upon request. The **Contractor** shall retain all documentation generated in the best available technology selection process for as long as the selected best available technology is in use.

5.4.3(b) No **Contractor** shall be required to replace best available technology for reducing the emission of pollutants or other authorized technology utilized for a diesel-powered Nonroad Vehicle in accordance with the provisions of this Article 5.4.3 within three (3) years of having first utilized such technology for such vehicle.

5.4.3(c) This Article 5.4.3 shall not apply to any vehicle used to satisfy the requirements of a specific Public Works Contract for fewer than twenty (20) **Days**.

5.4.3(d) The **Contractor** shall not be required to comply with this Article 5.4.3 with respect to a diesel-powered Nonroad Vehicle under the following circumstances:

5.4.3(d)(i) Where the **City Agency** makes a written finding, which is approved, in writing, by the DEP Commissioner, that the best available technology for reducing the emission of pollutants as required by this Article 5.4.3 is unavailable for such vehicle, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(ii) Where the DEP Commissioner has issued a written waiver based upon the Contractor having demonstrated to the DEP Commissioner that the use of the best available technology for reducing the emission of pollutants might endanger the operator of such vehicle or those working near such vehicle, due to engine malfunction, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle, which would not endanger the operator of such vehicle or those working near such vehicle.

5.4.3(d)(iii) In determining which technology to use for the purposes of Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above, the **Contractor** shall primarily consider the reduction in emissions of particulate matter and secondarily consider the reduction in emissions of nitrogen oxides associated with the use of such technology, which shall in no event result in an increase in the emissions of either such pollutant.

5.4.3(d)(iv) The **Contractor** shall submit requests for a finding or a waiver pursuant to this Article 5.4.3(d) in writing to the DEP Commissioner, with a copy to the **ACCO** of the **City Agency** letting this **Contract**. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above shall expire after one hundred eighty (180) **Days**, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the **City Agency** renews the finding, in writing, and the DEP Commissioner approves such finding, in writing, or the DEP Commissioner renews the waiver, in writing.

5.4.3(e) The requirements of this Article 5.4.3 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.4 Section 24-163 of the Administrative Code. The **Contractor** shall comply with Section 24-163 of the Administrative Code related to the idling of the engines of motor vehicles while parking.

5.4.5 Compliance

5.4.5(a) The **Contractor's** compliance with Article 5.4 may be independently monitored. If it is determined that the **Contractor** has failed to comply with any provision of Article 5.4, any costs associated with any independent monitoring incurred by the **City** shall be reimbursed by the **Contractor**.

5.4.5(b) Any **Contractor** who violates any provision of Article 5.4, except as provided in Article 5.4.5(c) below, shall be liable for a civil penalty between the amounts of one thousand (\$1,000) and ten thousand (\$10,000) dollars, in addition to twice the amount of money saved by such **Contractor** for failure to comply with Article 5.4.

5.4.5(c) No **Contractor** shall make a false claim with respect to the provisions of Article 5.4 to a **City Agency**. Where a **Contractor** has been found to have done so, such **Contractor** shall be liable for a civil penalty of twenty thousand (\$20,000) dollars, in addition to twice the amount of money saved by such **Contractor** in association with having made such false claim.

5.4.6 Reporting

5.4.6(a) For all Public Works Contracts covered by this Article 5.4, the **Contractor** shall report to the **City Agency** the following information:

5.4.6(a)(i) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(a)(ii) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(a)(iii) The number of such Nonroad Vehicles that utilized the best available technology for reducing the emission of pollutants, including a breakdown by vehicle model and the type of technology;

5.4.6(a)(iv) The number of such Nonroad Vehicles that utilized such other authorized technology in accordance with Article 5.4.3, including a breakdown by vehicle model and the type of technology used for each such vehicle;

5.4.6(a)(v) The locations where such Nonroad Vehicles were used; and

5.4.6(a)(vi) Where a determination is in effect pursuant to Article 5.4.2(b) or 5.4.2(c), detailed information concerning the **Contractor's** efforts to obtain Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm).

5.4.6(b) The **Contractor** shall submit the information required by Article 5.4.6(a) at the completion of **Work** under the Public Works Contract and on a yearly basis no later than August 1 throughout the term of the Public Works Contract. The yearly report shall cover **Work** performed during the preceding fiscal year (July 1 - June 30).

5.5 Ultra Low Sulfur Diesel Fuel. In accordance with the Coordinated Construction Act for Lower Manhattan, as amended:

5.5.1 Definitions. For purposes of this Article 5.5, the following definitions apply:

5.5.1(a) "Lower Manhattan" means the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson River as it exists now or may be extended would intersect with the southerly line of West Houston Street in the Borough of Manhattan extended, thence easterly along the southerly side of West Houston Street to the southerly side of Houston Street, thence easterly along the southerly side of Houston Street to the southerly side of East Houston Street, thence northeasterly along the southerly side of East Houston Street to the point where it would intersect with the United States pierhead line in the East River as it exists now or may be extended, including tax lots within or immediately adjacent thereto.

5.5.1(b) "Lower Manhattan Redevelopment Project" means any project in Lower Manhattan that is funded in whole or in part with federal or State funding, or any project intended to improve transportation between Lower Manhattan and the two air terminals in the **City** known as LaGuardia Airport and John F. Kennedy International Airport, or between Lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

5.5.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.5.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower (HP) and greater, and that is not a Motor Vehicle or a vehicle used

solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) HP or less and that are not used in any construction program or project.

5.5.1(e) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.5.2 Requirements. **Contractors** and **Subcontractors** are required to use only Ultra Low Sulfur Diesel Fuel to power the diesel-powered Nonroad Vehicles with engine HP rating of fifty (50) HP and above used on a Lower Manhattan Redevelopment Project and, where practicable, to reduce the emission of pollutants by retrofitting such Nonroad Vehicles with oxidation catalysts, particulate filters, or technology that achieves lowest particulate matter emissions.

5.6 Pesticides. In accordance with Section 17-1209 of the Administrative Code, to the extent that the **Contractor** or any **Subcontractor** applies pesticides to any property owned or leased by the **City**, the **Contractor**, and any **Subcontractor** shall comply with Chapter 12 of the Administrative Code.

5.7 Waste Treatment, Storage, and Disposal Facilities and Transporters. In connection with the **Work**, the **Contractor** and any **Subcontractor** shall use only those waste treatment, storage, and disposal facilities and waste transporters that possess the requisite license, permit or other governmental approval necessary to treat, store, dispose, or transport the waste, materials or hazardous substances.

5.8 Environmentally Preferable Purchasing. The **Contractor** shall ensure that products purchased or leased by the **Contractor** or any **Subcontractor** for the **Work** that are not specified by the **City** or are submitted as equivalents to a product specified by the **City** comply with the requirements of the New York City Environmentally Preferable Purchasing Program contained in Chapter 11 of Title 43 of the RCNY, pursuant to Chapter 3 of Title 6 of the Administrative Code.

ARTICLE 6. INSPECTION

6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe, and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.

6.2 The **Contractor's** obligation hereunder shall include the uncovering or taking down of finished **Work** and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if **Work** thus exposed proves satisfactory, and if the **Contractor** has complied with Article 6.1, such uncovering or taking down and restoration shall be considered an item of **Extra Work** to be paid for in accordance with the provisions of Article 26. If the **Work** thus exposed proves unsatisfactory, the **City** has no obligation to compensate the **Contractor** for the uncovering, taking down or restoration.

6.3 Inspection and approval by the **Commissioner**, the **Engineer**, **Project Manager**, or **Resident Engineer**, of finished **Work** or of **Work** being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the **Contractor** of its obligation to perform the **Work** in strict accordance with the **Contract**. Finished or unfinished **Work** not found to be in strict accordance with the

Contract shall be replaced as directed by the **Engineer**, even though such **Work** may have been previously approved and paid for. Such corrective **Work** is **Contract Work** and shall not be deemed **Extra Work**.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

ARTICLE 7. PROTECTION OF WORK AND OF PERSONS AND PROPERTY; NOTICES AND INDEMNIFICATION

7.1 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall be under an absolute obligation to protect the finished and unfinished **Work** against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such **Work** at the **Contractor's** sole cost and expense, as directed by the **Resident Engineer**. The obligation to deliver finished **Work** in strict accordance with the **Contract** prior to **Final Acceptance** shall be absolute and shall not be affected by the **Resident Engineer's** approval of, or failure to prohibit, the **Means and Methods of Construction** used by the **Contractor**.

7.2 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall take all reasonable precautions to protect all persons and the property of the **City** and of others from damage, loss or injury resulting from the **Contractor's**, and/or its **Subcontractors'** operations under this **Contract**. The **Contractor's** obligation to protect shall include the duty to provide, place or replace, and adequately maintain at or about the **Site** suitable and sufficient protection such as lights, barricades, and enclosures.

7.3 The **Contractor** shall comply with the notification requirements set forth below in the event of any loss, damage or injury to **Work**, persons or property, or any accidents arising out of the operations of the **Contractor** and/or its **Subcontractors** under this **Contract**.

7.3.1 The **Contractor** shall make a full and complete report in writing to the **Resident Engineer** within three (3) **Days** after the occurrence.

7.3.2 The **Contractor** shall also send written notice of any such event to all insurance carriers that issued potentially responsive policies (including commercial general liability insurance carriers for events relating to the **Contractor's** own employees) no later than twenty (20) days after such event and again no later than twenty (20) days after the initiation of any claim and/or action resulting therefrom. Such notice shall contain the following information: the number of the insurance policy, the name of the Named Insured, the date and location of the incident, and the identity of the persons injured or property damaged. For any policy on which the **City** and/or the **Engineer, Architect, or Project Manager** are Additional Insureds, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Additional Insured, such other Additional Insureds, as well as the Named Insured."

7.3.2(a) Whenever such notice is sent under a policy on which the **City** is an Additional Insured, the **Contractor** shall provide copies of the notice to the **Comptroller, the Commissioner** and the **City Corporation Counsel**. The copy to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, New York, 10007. The copy to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions. The copy to the **City Corporation Counsel** shall be sent to Insurance Claims Specialist, Affirmative Litigation

Division, New York City Law Department, 100 Church Street, New York, New York 10007.

7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements, and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the **City**.

7.4 To the fullest extent permitted by law, the **Contractor** shall defend, indemnify, and hold the **City**, its employees, and officials (the "Indemnitees") harmless against any and all claims (including but not limited to claims asserted by any employee of the **Contractor** and/or its **Subcontractors**) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract** or from the **Contractor's** and/or its **Subcontractors'** failure to comply with any of the provisions of this **Contract** or of the **Law**. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of **Law** or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of **Law**, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.

7.5 The provisions of this Article 7 shall not be deemed to create any new right of action in favor of third parties against the **Contractor** or the **City**.

CHAPTER III: TIME PROVISIONS

ARTICLE 8. COMMENCEMENT AND PROSECUTION OF THE WORK

8.1 The **Contractor** shall commence the **Work** on the date specified in the **Notice to Proceed** or the **Order to Work**. The time for performance of the **Work** under the **Contract** shall be computed from the date specified in the **Notice to Proceed** or the **Order to Work**. **TIME BEING OF THE ESSENCE** to the **City**, the **Contractor** shall thereafter prosecute the **Work** diligently, using such **Means and Methods of Construction** as are in accord with Article 4 herein and as will assure its completion not later than the date specified in this **Contract**, or on the date to which the time for completion may be extended.

ARTICLE 9. PROGRESS SCHEDULES

9.1 To enable the **Work** to be performed in an orderly and expeditious manner, the **Contractor**, within fifteen (15) **Days** after the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule based on the Critical Path Method in the form of

a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and

9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related contracts; and

9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**, including the anticipated time for obtaining required approvals pursuant to Article 10; and

9.1.4 The estimated amount in dollars the **Contractor** will claim on a monthly basis.

9.2 The proposed schedule shall be revised as directed by the **Engineer**, until finally approved by the **Engineer**, and after such approval, subject to the provisions of Article 11, shall be strictly adhered to by the **Contractor**.

9.3 If the **Contractor** shall fail to adhere to the approved progress schedule, or to the schedule as revised pursuant to Article 11, it shall promptly adopt such other or additional **Means and Methods of Construction**, at its sole cost and expense, as will make up for the time lost and will assure completion in accordance with the approved progress schedule. The approval by the **City** of a progress schedule which is shorter than the time allotted under the **Contract** shall not create any liability for the **City** if the approved progress schedule is not met.

9.4 The **Contractor** will not receive any payments until the proposed progress schedule is submitted.

ARTICLE 10. REQUESTS FOR INFORMATION OR APPROVAL

10.1 From time to time as the **Work** progresses and in the sequence indicated by the approved progress schedule, the **Contractor** shall submit to the **Engineer** a specific request in writing for each item of information or approval required by the **Contractor**. These requests shall state the latest date upon which the information or approval is actually required by the **Contractor**, and shall be submitted in a reasonable time in advance thereof to provide the **Engineer** a sufficient time to act upon such submissions, or any necessary re-submissions thereof.

10.2 The **Contractor** shall not have any right to an extension of time on account of delays due to the **Contractor's** failure to submit requests for the required information or the required approval in accordance with the above requirements.

ARTICLE 11. NOTICE OF CONDITIONS CAUSING DELAY AND DOCUMENTATION OF DAMAGES CAUSED BY DELAY

11.1 After the commencement of any condition which is causing or may cause a delay in completion of the **Work**, including conditions for which the **Contractor** may be entitled to an extension of time, the following notifications and submittals are required:

11.1.1 Within fifteen (15) **Days** after the **Contractor** becomes aware or reasonably should be

aware of each such condition, the **Contractor** must notify the **Resident Engineer** or **Engineer**, as directed by the **Commissioner**, in writing of the existence, nature and effect of such condition upon the approved progress schedule and the **Work**, and must state why and in what respects, if any, the condition is causing or may cause a delay. Such notice shall include a description of the construction activities that are or could be affected by the condition and may include any recommendations the **Contractor** may have to address the delay condition and any activities the **Contractor** may take to avoid or minimize the delay.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article 11, within forty-five (45) **Days** from the time such damages are first incurred for each such condition, the **Contractor** shall submit to the **Commissioner** a verified written statement of the details and estimates of the amounts of such damages, including categories of expected damages and projected monthly costs, together with documentary evidence of such damages as the **Contractor** may have at the time of submission (“statement of delay damages”), as further detailed in Article 11.6. The **Contractor** may submit the above statement within such additional time as may be granted by the **Commissioner** in writing upon written request therefor.

11.1.3 Articles 11.1.1 and 11.1.2 do not relieve the **Contractor** of its obligation to comply with the provisions of Article 44.

11.2 Failure of the **Contractor** to strictly comply with the requirements of Article 11.1.1 may, in the discretion of the **Commissioner**, be deemed sufficient cause to deny any extension of time on account of delay arising out of such condition. Failure of the **Contractor** to strictly comply with the requirements of both Articles 11.1.1 and 11.1.2 shall be deemed a conclusive waiver by the **Contractor** of any and all claims for damages for delay arising from such condition and no right to recover on such claims shall exist.

11.3 When appropriate and directed by the **Engineer**, the progress schedule shall be revised by the **Contractor** until finally approved by the **Engineer**. The revised progress schedule must be strictly adhered to by the **Contractor**.

11.4 Compensable Delays

11.4.1 The **Contractor** agrees to make claim only for additional costs attributable to delay in the performance of this **Contract** necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the **Commissioner** and required to maintain the progress schedule, occasioned solely by any act or omission to act of the **City** listed below. The **Contractor** also agrees that delay from any other cause shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**.

11.4.1.1 The failure of the **City** to take reasonable measures to coordinate and progress the **Work** to the extent required by the **Contract**, except that the **City** shall not be responsible for the **Contractor’s** obligation to coordinate and progress the **Work** of its **Subcontractors**.

11.4.1.2 Unreasonable delays attributable to the review of shop drawings, the issuance of change orders, or the cumulative impact of change orders that were not brought about by any act or omission of the **Contractor**.

11.4.1.3 The unavailability of the **Site** caused by acts or omissions of the **City**.

11.4.1.4 The issuance by the **Engineer** of a stop work order that was not brought about through any act or omission of the **Contractor**.

11.4.1.5 Differing site conditions or environmental hazards that were neither known nor reasonably ascertainable on a pre-bid inspection of the **Site** or review

of the bid documents or other publicly available sources, and that are not ordinarily encountered in the **Project's** geographical area or neighborhood or in the type of **Work** to be performed.

11.4.1.6 Delays caused by the **City's** bad faith or its willful, malicious, or grossly negligent conduct;

11.4.1.7 Delays not contemplated by the parties;

11.4.1.8 Delays so unreasonable that they constitute an intentional abandonment of the **Contract** by the **City**; and

11.4.1.9 Delays resulting from the **City's** breach of a fundamental obligation of the **Contract**.

11.4.2 No claim may be made for any alleged delay in **Substantial Completion** of the **Work** if the **Work** will be or is substantially completed by the date of **Substantial Completion** provided for in Schedule A unless acceleration has been directed by the **Commissioner** to meet the date of **Substantial Completion** set forth in Schedule A, or unless there is a provision in the **Contract** providing for additional compensation for early completion.

11.4.3 The provisions of this Article 11 apply only to claims for additional costs attributable to delay and do not preclude determinations by the **Commissioner** allowing reimbursements for additional costs for **Extra Work** pursuant to Articles 25 and 26 of this **Contract**. To the extent that any cost attributable to delay is reimbursed as part of a change order, no additional claim for compensation under this Article 11 shall be allowed.

11.5 Non-Compensable Delays. The **Contractor** agrees to make no claim for, and is deemed to have included in its bid prices for the various items of the **Contract**, the extra/additional costs attributable to any delays caused by or attributable to the items set forth below. For such items, the **Contractor** shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**, in accordance with the provisions of Article 13. Such extensions of time will be granted, if at all, pursuant to the grounds set forth in Article 13.3.

11.5.1 The acts or omissions of any third parties, including but not limited to **Other Contractors**, public/ governmental bodies (other than **City Agencies**), utilities or private enterprises, who are disclosed in the **Contract Documents** or are ordinarily encountered or generally recognized as related to the **Work**;

11.5.2 Any situation which was within the contemplation of the parties at the time of entering into the **Contract**, including any delay indicated or disclosed in the **Contract Documents** or that would be generally recognized by a reasonably prudent contractor as related to the nature of the **Work**, and/or the existence of any facility or appurtenance owned, operated or maintained by any third party, as indicated or disclosed in the **Contract Documents** or ordinarily encountered or generally recognized as related to the nature of the **Work**;

11.5.3 Restraining orders, injunctions or judgments issued by a court which were caused by a Contractor's submission, action or inaction or by a Contractor's **Means and Methods of Construction**, or by third parties, unless such order, injunction or judgment was the result of an act or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing, lockout or similar situation;

11.5.5 Any shortages of supplies or materials, or unavailability of equipment, required by the **Contract Work**;

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God, or acts of war or of the public enemy or terrorist acts, including the **City's** reasonable responses thereto; and

11.5.7 **Extra Work** which does not significantly affect the overall completion of the **Contract**, reasonable delays in the review or issuance of change orders or field orders and/or in shop drawing reviews or approvals.

11.6 Required Content of Submission of Statement of Delay Damages

11.6.1 In the verified written statement of delay damages required by Article 11.1.2, the following information shall be provided by the **Contractor**:

11.6.1.1 For each delay, the start and end dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, an explanation of how they were delayed, and the reasons for the delay, including identifying the applicable act or omission of the City listed in Article 11.4.

11.6.1.2 A detailed factual statement of the claim providing all necessary dates, locations and items of **Work** affected by the claim.

11.6.1.3 The estimated amount of additional compensation sought and a breakdown of that amount into categories as described in Article 11.7.

11.6.1.4 Any additional information requested by the **Commissioner**.

11.7 Recoverable Costs

11.7.1 Delay damages may be recoverable for the following costs actually and necessarily incurred in the performance of the **Work**:

11.7.1.1 Direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits, based on time and materials records;

11.7.1.2 Necessary materials (including transportation to the **Site**), based on time and material records;

11.7.1.3 Reasonable rental value of necessary plant and equipment other than small tools, plus fuel/energy costs according to the applicable formula set forth in Articles 26.2.4 and/or 26.2.8, based on time and material records;

11.7.1.4 Additional insurance and bond costs;

11.7.1.5 Extended **Site** overhead, field office rental, salaries of field office staff, on-site project managers and superintendents, field office staff vehicles, **Project**-specific storage, field office utilities and telephone, and field office consumables;

11.7.1.6 Labor escalation costs based on actual costs;

11.7.1.7 Materials and equipment escalation costs based on applicable industry indices unless documentation of actual increased cost is provided;

11.7.1.8 Additional material and equipment storage costs based on actual documented costs and additional costs necessitated by extended manufacturer warranty periods; and

11.7.1.9 Extended home office overhead calculated based on the following formula:

(1) Subtract from the original **Contract** amount the amount earned by original contractual **Substantial Completion** date (not

- including change orders);
- (2) Remove 15% overhead and profit from the calculation in item (1) by dividing the results of item (1) by 1.15;
- (3) Multiply the result of item (2) by 7.25% for the total home office overhead;
- (4) Multiply the result of item (3) by 7.25% for the total profit; and
- (5) The total extended home office overhead will be the total of items (3) and (4).

11.7.2 Recoverable Subcontractor Costs. When the **Work** is performed by a **Subcontractor**, the **Contractor** may be paid the actual and necessary costs of such subcontracted **Work** as outlined above in Articles 11.7.1.1 through 11.7.1.8, and an additional overhead of 5% of the costs outlined in Articles 11.7.1.1 through 11.7.1.3.

11.7.3 Non-Recoverable Costs. The parties agree that the **City** will have no liability for the following items and the **Contractor** agrees it shall make no claim for the following items:

11.7.3.1 Profit, or loss of anticipated or unanticipated profit, except as provided in Article 11.7.1.9;

11.7.3.2 Consequential damages, including, but not limited to, construction or bridge loans or interest paid on such loans, loss of bonding capacity, bidding opportunities, or interest in investment, or any resulting insolvency;

11.7.3.3 Indirect costs or expenses of any nature except those included in Article 11.7.1;

11.7.3.4 Direct or indirect costs attributable to performance of **Work** where the **Contractor**, because of situations or conditions within its control, has not progressed the **Work** in a satisfactory manner; and

11.7.3.5 Attorneys' fees and dispute and claims preparation expenses.

11.8 Any claims for delay under this Article 11 are not subject to the jurisdiction of the Contract Dispute Resolution Board pursuant to the dispute resolution process set forth in Article 27.

11.9 Any compensation provided to the **Contractor** in accordance with this Article 11 will be made pursuant to a claim filed with the **Comptroller**. Nothing in this Article 11 extends the time for the **Contractor** to file an action with respect to a claim within six months after **Substantial Completion** pursuant to Article 56.

ARTICLE 12. COORDINATION WITH OTHER CONTRACTORS

12.1 During the progress of the **Work**, **Other Contractors** may be engaged in performing other work or may be awarded other contracts for additional work on this **Project**. In that event, the **Contractor** shall coordinate the **Work** to be done hereunder with the work of such **Other Contractors** and the **Contractor** shall fully cooperate with such **Other Contractors** and carefully fit its own **Work** to that provided under other contracts as may be directed by the **Engineer**. The **Contractor** shall not commit or permit any act which will interfere with the performance of work by any **Other Contractors**.

12.2 If the **Engineer** determines that the **Contractor** is failing to coordinate its **Work** with the work of **Other Contractors** as the **Engineer** has directed, then the **Commissioner** shall have the right to withhold any payments otherwise due hereunder until the **Contractor** completely complies with the **Engineer's** directions.

12.3 The **Contractor** shall notify the **Engineer** in writing if any **Other Contractor** on this **Project** is failing to coordinate its work with the **Work** of this **Contract**. If the **Engineer** finds such charges to be true, the **Engineer** shall promptly issue such directions to the **Other Contractor** with respect thereto as the situation may require. The **City** shall not, however, be liable for any damages suffered by any **Other Contractor's** failure to coordinate its work with the **Work** of this **Contract** or by reason of the **Other Contractor's** failure to promptly comply with the directions so issued by the **Engineer**, or by reason of any **Other Contractor's** default in performance, it being understood that the **City** does not guarantee the responsibility or continued efficiency of any contractor. The **Contractor** agrees to make no claim against the **City** for any damages relating to or arising out of any directions issued by the **Engineer** pursuant to this Article 12 (including but not limited to the failure of any **Other Contractor** to comply or promptly comply with such directions), or the failure of any **Other Contractor** to coordinate its work, or the default in performance of any **Other Contractor**.

12.4 The **Contractor** shall indemnify and hold the **City** harmless from any and all claims or judgments for damages and from costs and expenses to which the **City** may be subjected or which it may suffer or incur by reason of the **Contractor's** failure to comply with the **Engineer's** directions promptly; and the **Comptroller** shall have the right to exercise the powers reserved in Article 23 with respect to any claims which may be made for damages due to the **Contractor's** failure to comply with the **Engineer's** directions promptly. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.5 Should the **Contractor** sustain any damage through any act or omission of any **Other Contractor** having a contract with the **City** for the performance of work upon the **Site** or of work which may be necessary to be performed for the proper prosecution of the **Work** to be performed hereunder, or through any act or omission of a subcontractor of such **Other Contractor**, the **Contractor** shall have no claim against the **City** for such damage, but shall have a right to recover such damage from the **Other**

12.5 **Contractor** under the provision similar to the following provisions which apply to this Contract and have been or will be inserted in the contracts with such Other Contractors:

12.5.1 Should any **Other Contractor** having or who shall hereafter have a contract with the **City** for the performance of work upon the **Site** sustain any damage through any act or omission of the **Contractor** hereunder or through any act or omission of any **Subcontractor** of the **Contractor**, the **Contractor** agrees to reimburse such **Other Contractor** for all such damages and to defend at its own expense any action based upon such claim and if any judgment or claim (even if the allegations of the action are without merit) against the **City** shall be allowed the **Contractor** shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and agrees to indemnify and hold the **City** harmless from all such claims. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.6 The **City's** right to indemnification hereunder shall in no way be diminished, waived or discharged by its recourse to assessment of liquidated damages as provided in Article 15, or by the exercise of any other remedy provided for by **Contract** or by **Law**.

ARTICLE 13. EXTENSION OF TIME FOR PERFORMANCE

13.1 If performance by the **Contractor** is delayed for a reason set forth in Article 13.3, the **Contractor** may be allowed a reasonable extension of time in conformance with this Article 13 and the **PPB**

Rules.

13.2 Any extension of time may be granted only by the **ACCO** or by the Board for the Extension of Time (hereafter “Board”) (as set forth below) upon written application by the **Contractor**.

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By the acts or omissions of the **City**, its officials, agents or employees; or

13.3.2 By the act or omissions of **Other Contractors** on this **Project**; or

13.3.3 By supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, excessive inclement weather, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes not brought about by any act or omission of the **Contractor**).

13.3.4 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

13.4 The **Contractor** shall not be entitled to receive a separate extension of time for each of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the **Work** as determined by the **ACCO** or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the **Contractor** or of its **Subcontractors** or **Materialmen**, and would of itself (irrespective of the concurrent causes) have delayed the **Work**, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.

13.5 The determination made by the **ACCO** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The **ACCO** or the Board acting entirely within their discretion may grant an application for an extension of time for causes of delay other than those herein referred.

13.7 Permitting the **Contractor** to continue with the **Work** after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the **Contractor** after such time, shall in no way operate as a waiver on the part of the **City** of any of its rights under this **Contract**.

13.8 Application for Extension of Time:

13.8.1 Before the **Contractor’s** time extension request will be considered, the **Contractor** shall notify the **ACCO** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **ACCO** identifying:

13.8.1(a) The **Contractor**; the registration number; and **Project** description;

13.8.1(b) Liquidated damage assessment rate, as specified in the **Contract**;

13.8.1(c) Original total bid price;

13.8.1(d) The original **Contract** start date and completion date;

13.8.1(e) Any previous time extensions granted (number and duration); and

13.8.1(f) The extension of time requested.

13.8.2 In addition, the application for extension of time shall set forth in detail:

13.8.2(a) The nature of each alleged cause of delay in completing the **Work**;

13.8.2(b) The date upon which each such cause of delay began and ended and the number of **Days** attributable to each such cause;

13.8.2(c) A statement that the **Contractor** waives all claims except for those delineated in the application, and the particulars of any claims which the **Contractor** does not agree to waive. For time extensions for **Substantial Completion** and final completion payments, the application shall include a detailed statement of the dollar amounts of each element of claim item reserved; and

13.8.2(d) A statement indicating the **Contractor's** understanding that the time extension is granted only for purposes of permitting continuation of **Contract** performance and payment for **Work** performed and that the **City** retains its right to conduct an investigation and assess liquidated damages as appropriate in the future.

13.9 Analysis and Approval of Time Extensions:

13.9.1 For time extensions for partial payments, a written determination shall be made by the **ACCO** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:

13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;

13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;

13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or

13.9.1(d) If exceptional circumstances exist, the **ACCO** may extend the time for performance beyond the extensions in Articles 13.9.1(a), 13.9.1(b), and 13.9.1(c). In that event, the **ACCO** shall file with the Mayor's Office of Contract Services a written explanation of the exceptional circumstances.

13.9.2 For extensions of time for **Substantial Completion** and final completion payments, the **Engineer**, in consultation with the **ACCO**, shall prepare a written analysis of the delay (including a preliminary determination of the causes of delay, the beginning and end dates for each such cause of delay, and whether the delays are excusable under the terms of this **Contract**). The report shall be subject to review by and approval of the Board, which shall have authority to question its analysis and determinations and request additional facts or documentation. The report as reviewed and made final by the Board shall be made a part of the **Agency** contract file. Neither the report itself nor anything contained therein shall operate as a

waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

13.9.3 Approval Mechanism for Time Extensions for **Substantial Completion** or Final Completion Payments: An extension shall be granted only with the approval of the Board which is comprised of the **ACCO** of the **Agency**, the **City** Corporation Counsel, and the **Comptroller**, or their authorized representatives.

13.9.4 Neither the granting of any application for an extension of time to the **Contractor** or any **Other Contractor** on this **Project** nor the papers, records or reports related to any application for or grant of an extension of time or determination related thereto shall be referred to or offered in evidence by the **Contractor** or its attorneys in any action or proceeding.

13.10 No Damage for Delay: The **Contractor** agrees to make no claim for damages for delay in the performance of this **Contract** occasioned by any act or omission to act of the **City** or any of its representatives, except as provided for in Article 11.

ARTICLE 14. COMPLETION AND FINAL ACCEPTANCE OF THE WORK

14.1 Date for **Substantial Completion**: The **Contractor** shall substantially complete the **Work** within the time fixed in Schedule A of the General Conditions, or within the time to which such **Substantial Completion** may be extended.

14.2 Determining the Date of **Substantial Completion**: The **Work** will be deemed to be substantially complete when the two conditions set forth below have been met.

14.2.1 Inspection: The **Engineer** or **Resident Engineer**, as applicable, has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 Approval of **Final Approved Punch List** and Date for **Final Acceptance**: Following inspection of the **Work**, the **Engineer/Resident Engineer** shall furnish the **Contractor** with a final punch list, specifying all items of **Work** to be completed and proposing dates for the completion of each specified item of **Work**. The **Contractor** shall then submit in writing to the **Engineer/Resident Engineer** within ten (10) **Days** of the **Engineer/Resident Engineer** furnishing the final punch list either acceptance of the dates or proposed alternative dates for the completion of each specified item of **Work**. If the **Contractor** neither accepts the dates nor proposes alternative dates within ten (10) **Days**, the schedule proposed by the **Engineer/Resident Engineer** shall be deemed accepted. If the **Contractor** proposes alternative dates, then, within a reasonable time after receipt, the **Engineer/Resident Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, the **Engineer/Resident Engineer** shall establish dates for the completion of each item of **Work**. The latest completion date specified shall be the date for **Final Acceptance** of the **Work**.

14.3 Date of **Substantial Completion**. The date of approval of the **Final Approved Punch List**, shall be the date of **Substantial Completion**. The date of approval of the **Final Approved Punch List** shall be either (a) if the **Contractor** approves the final punch list and proposed dates for completion furnished by the **Engineer/Resident Engineer**, the date of the **Contractor's** approval; or (b) if the **Contractor** neither accepts the dates nor proposes alternative dates, ten (10) **Days** after the **Engineer/Resident Engineer** furnishes the **Contractor** with a final punch list and proposed dates for completion; or (c) if the **Contractor** proposes alternative dates, the date that the **Engineer/Resident Engineer** sends written notification to the

Contractor either approving the **Contractor's** proposed alternative dates or establishing dates for the completion for each item of **Work**.

14.4 Determining the Date of **Final Acceptance**: The **Work** will be accepted as final and complete as of the date of the **Engineer's/Resident Engineer's** inspection if, upon such inspection, the **Engineer/Resident Engineer** finds that all items on the **Final Approved Punch List** are complete and no further **Work** remains to be done. The **Commissioner** will then issue a written determination of **Final Acceptance**.

14.5 Request for Inspection: Inspection of the **Work** by the **Engineer/Resident Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within fourteen (14) **Days** after receipt of the **Contractor's** written request therefor.

14.6 Request for Re-inspection: If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** determines that there are items of **Work** still to be performed, the **Contractor** shall promptly perform them and then request a re-inspection. If upon re-inspection, the **Engineer/Resident Engineer** determines that the **Work** is substantially complete or finally accepted, the date of such re-inspection shall be the date of **Substantial Completion** or **Final Acceptance**. Re-inspection by the **Engineer/Resident Engineer** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.7 Initiation of Inspection by the **Engineer/Resident Engineer**: If the **Contractor** does not request inspection or re-inspection of the **Work** for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** may initiate such inspection or re-inspection.

ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to substantially complete the **Work** within the time fixed for such **Substantial Completion** in Schedule A of the General Conditions, plus authorized time extensions, or if the **Contractor**, in the sole determination of the **Commissioner**, has abandoned the **Work**, the **Contractor** shall pay to the **City** the sum fixed in Schedule A of the General Conditions, for each and every **Day** that the time consumed in substantially completing the **Work** exceeds the time allowed therefor; which said sum, in view of the difficulty of accurately ascertaining the loss which the **City** will suffer by reason of delay in the **Substantial Completion** of the **Work** hereunder, is hereby fixed and agreed as the liquidated damages that the **City** will suffer by reason of such delay, and not as a penalty. This Article 15 shall also apply to the **Contractor** whether or not the **Contractor** is defaulted pursuant to Chapter X of this **Contract**. Neither the failure to assess liquidated damages nor the granting of any time extension shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

15.2 Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the **City's** right to indemnification, or the **Contractor's** obligation to indemnify the **City**, or to any other remedy provided for in this **Contract** or by **Law**.

15.3 The **Commissioner** may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered by the **City**, the **Contractor** shall be liable to pay the difference.

ARTICLE 16. OCCUPATION OR USE PRIOR TO COMPLETION

16.1 Unless otherwise provided for in the **Specifications**, the **Commissioner** may take over, use, occupy or operate any part of the **Work** at any time prior to **Final Acceptance**, upon written notification to the **Contractor**. The **Engineer** or **Resident Engineer**, as applicable, shall inspect the part of the **Work** to be taken over, used, occupied, or operated, and will furnish the **Contractor** with a written statement of the **Work**, if any, which remains to be performed on such part. The **Contractor** shall not object to, nor interfere with, the **Commissioner's** decision to exercise the rights granted by Article 16. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work**:

16.1.1 the **Engineer/Resident Engineer** shall issue a written determination of **Substantial Completion** with respect to such part of the **Work**;

16.1.2 the **Contractor** shall be relieved of its absolute obligation to protect such part of the unfinished **Work** in accordance with Article 7;

16.1.3 the **Contractor's** guarantee on such part of the **Work** shall begin on the date of such use by the **City**; and;

16.1.4 the **Contractor** shall be entitled to a return of so much of the amount retained in accordance with Article 21 as it relates to such part of the **Work**, except so much thereof as may be retained under Articles 24 and 44.

CHAPTER IV: SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 17. SUBCONTRACTS

17.1 The **Contractor** shall not make subcontracts totaling an amount more than the percentage of the total **Contract** price fixed in Schedule A of the General Conditions, without prior written permission from the **Commissioner**. All subcontracts made by the **Contractor** shall be in writing. No **Work** may be performed by a **Subcontractor** prior to the **Contractor** entering into a written subcontract with the **Subcontractor** and complying with the provisions of this Article 17.

17.2 Before making any subcontracts, the **Contractor** shall submit a written statement to the **Commissioner** giving the name and address of the proposed **Subcontractor**; the portion of the **Work** and materials which it is to perform and furnish; the cost of the subcontract; the VENDEX questionnaire if required; the proposed subcontract if requested by the **Commissioner**; and any other information tending to prove that the proposed **Subcontractor** has the necessary facilities, skill, integrity, past experience, and financial resources to perform the **Work** in accordance with the terms and conditions of this **Contract**.

17.3 In addition to the requirements in Article 17.2, **Contractor** is required to list the **Subcontractor** in the web based Subcontractor Reporting System through the City's Payee Information Portal (PIP), available at www.nyc.gov/pip.¹ For each **Subcontractor** listed, **Contractor** is required to provide the following information: maximum contract value, description of **Subcontractor's** Work, start and end date of the subcontract and identification of the **Subcontractor's** industry. Thereafter, **Contractor** will be required to report in the system the payments made to each **Subcontractor** within 30 days of making the

¹ In order to use the new system, a PIP account will be required. Detailed instructions on creating a PIP account and using the new system are also available at www.nyc.gov/pip. Additional assistance with PIP may be obtained by emailing the Financial Information Services Agency Help Desk at pip@fisa.nyc.gov.

payment. If any of the required information changes throughout the Term of the **Contract**, **Contractor** will be required to revise the information in the system.

Failure of the **Contractor** to list a **Subcontractor** and/or to report **Subcontractor** payments in a timely fashion may result in the **Commissioner** declaring the **Contractor** in default of the **Contract** and will subject **Contractor** to liquidated damages in the amount of \$100 per day for each day that the **Contractor** fails to identify a **Subcontractor** along with the required information about the **Subcontractor** and/or fails to report payments to a **Subcontractor**, beyond the time frames set forth herein or in the notice from the **City**. Article 15 shall govern the issue of liquidated damages.

17.4 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed sub-subcontract shall be submitted in the same manner as directed above.

17.5 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is approved. If the proposed **Subcontractor** is not approved, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted to enter or perform any work on the **Site** unless approved.

17.6 Before entering into any subcontract hereunder, the **Contractor** shall provide the proposed **Subcontractor** with a complete copy of this document and inform the proposed **Subcontractor** fully and completely of all provisions and requirements of this **Contract** relating either directly or indirectly to the **Work** to be performed and the materials to be furnished under such subcontract, and every such **Subcontractor** shall expressly stipulate that all labor performed and materials furnished by the **Subcontractor** shall strictly comply with the requirements of this **Contract**.

17.7 Documents given to a prospective **Subcontractor** for the purpose of soliciting the **Subcontractor's** bid shall include either a copy of the bid cover or a separate information sheet setting forth the **Project** name, the **Contract** number (if available), the **Agency** (as noted in Article 2.1.6), and the **Project's** location.

17.8 The **Commissioner's** approval of a **Subcontractor** shall not relieve the **Contractor** of any of its responsibilities, duties, and liabilities hereunder. The **Contractor** shall be solely responsible to the **City** for the acts or defaults of its **Subcontractor** and of such **Subcontractor's** officers, agents, and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the **Contractor** to the extent of its subcontract.

17.9 If the **Subcontractor** fails to maintain the necessary facilities, skill, integrity, past experience, and financial resources (other than due to the **Contractor's** failure to make payments where required) to perform the **Work** in accordance with the terms and conditions of this **Contract**, the **Contractor** shall promptly notify the **Commissioner** and replace such **Subcontractor** with a newly approved **Subcontractor** in accordance with this Article 17.

17.10 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** maintain all insurance required by **Law**.

17.11 The **Contractor** shall promptly, upon request, file with the **Engineer** a conformed copy of the subcontract and its cost. The subcontract shall provide the following:

17.11.1 Payment to **Subcontractors**: The agreement between the **Contractor** and its **Subcontractor** shall contain the same terms and conditions as to method of payment for **Work**, labor, and materials, and as to retained percentages, as are contained in this **Contract**.

17.11.2 Prevailing Rate of Wages: The agreement between the **Contractor** and its **Subcontractor** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.11.3 Section 6-123 of the Administrative Code: Pursuant to the requirements of Section 6-123 of the Administrative Code, every agreement between the **Contractor** and a **Subcontractor** in excess of fifty thousand (\$50,000) dollars shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in Title VIII of the Administrative Code (Section 8-101 *et seq.*).

17.11.4 All requirements required pursuant to federal and/or state grant agreement(s), if applicable to the **Work**.

17.12 The **Commissioner** may deduct from the amounts certified under this **Contract** to be due to the **Contractor**, the sum or sums due and owing from the **Contractor** to the **Subcontractors** according to the terms of the said subcontracts, and in case of dispute between the **Contractor** and its **Subcontractor**, or **Subcontractors**, as to the amount due and owing, the **Commissioner** may deduct and withhold from the amounts certified under this **Contract** to be due to the **Contractor** such sum or sums as may be claimed by such **Subcontractor**, or **Subcontractors**, in a sworn affidavit, to be due and owing until such time as such claim or claims shall have been finally resolved.

17.13 On contracts where performance bonds and payment bonds are executed, the **Contractor** shall include on each requisition for payment the following data: **Subcontractor's** name, value of the subcontract, total amount previously paid to **Subcontractor** for **Work** previously requisitioned, and the amount, including retainage, to be paid to the **Subcontractor** for **Work** included in the requisition.

17.14 On **Contracts** where performance bonds and payment bonds are not executed, the **Contractor** shall include with each requisition for payment submitted hereunder, a signed statement from each and every **Subcontractor** and/or **Materialman** for whom payment is requested in such requisition. Such signed statement shall be on the letterhead of the **Subcontractor** and/or **Materialman** for whom payment is requested and shall (i) verify that such **Subcontractor** and/or **Materialman** has been paid in full for all **Work** performed and/or material supplied to date, exclusive of any amount retained and any amount included on the current requisition, and (ii) state the total amount of retainage to date, exclusive of any amount retained on the current requisition.

ARTICLE 18. ASSIGNMENTS

18.1 The **Contractor** shall not assign, transfer, convey or otherwise dispose of this **Contract**, or the right to execute it, or the right, title or interest in or to it or any part thereof, or assign, by power of attorney or otherwise any of the monies due or to become due under this **Contract**, unless the previous written consent of the **Commissioner** shall first be obtained thereto, and the giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments.

18.2 Such assignment, transfer, conveyance or other disposition of this **Contract** shall not be valid until filed in the office of the **Commissioner** and the **Comptroller**, with the written consent of the **Commissioner** endorsed thereon or attached thereto.

18.3 Failure to obtain the previous written consent of the **Commissioner** to such an assignment,

transfer, conveyance or other disposition, may result in the revocation and annulment of this **Contract**. The **City** shall thereupon be relieved and discharged from any further liability to the **Contractor**, its assignees, transferees or sublessees, who shall forfeit and lose all monies therefor earned under the **Contract**, except so much as may be required to pay the **Contractor's** employees.

18.4 The provisions of this clause shall not hinder, prevent, or affect an assignment by the **Contractor** for the benefit of its creditors made pursuant to the **Laws** of the State of New York.

18.5 This **Contract** may be assigned by the **City** to any corporation, agency or instrumentality having authority to accept such assignment.

CHAPTER V: CONTRACTOR'S SECURITY AND GUARANTEE

ARTICLE 19. SECURITY DEPOSIT

19.1 If performance and payment bonds are required, the **City** shall retain the bid security to ensure that the successful bidder executes the **Contract** and furnishes the required payment and performance security within ten (10) **Days** after notice of the award of the **Contract**. If the successful bidder fails to execute the **Contract** and furnish the required payment and performance security, the **City** shall retain such bid security as set forth in the Information for Bidders. If the successful bidder executes the **Contract** and furnishes the required payment and performance security, the **City** shall return the bid security within a reasonable time after the furnishing of such bonds and execution of the **Contract** by the **City**.

19.2 If performance and payment bonds are not required, the bid security shall be retained by the **City** as security for the **Contractor's** faithful performance of the **Contract**. If partial payments are provided, the bid security will be returned to the **Contractor** after the sum retained under Article 21 equals the amount of the bid security, subject to other provisions of this **Contract**. If partial payments are not provided, the bid security will be released when final payment is certified by the **City** for payment.

19.3 If the **Contractor** is declared in default under Article 48 prior to the return of the deposit, or if any claim is made such as referred to in Article 23, the amount of such deposit, or so much thereof as the **Comptroller** may deem necessary, may be retained and then applied by the **Comptroller**:

19.3.1 To compensate the **City** for any expense, loss or damage suffered or incurred by reason of or resulting from such default, including the cost of re-letting and liquidated damages; or

19.3.2 To indemnify the **City** against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

20.1 On **Contracts** where one hundred (100%) percent performance bonds and payment bonds are executed, this Article 20 does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond or where the **Contract** does not require a payment bond for one hundred (100%) percent of the **Contract** price, the **City** shall, in accordance with the terms of this Article 20, guarantee payment of all lawful claims for:

20.2.1 Wages and compensation for labor performed and/or services rendered; and

20.2.2 Materials, equipment, and supplies provided, whether incorporated into the **Work** or not, when demands have been filed with the **City** as provided hereinafter by any person, firm, or corporation which furnished labor, material, equipment, supplies, or any combination thereof, in connection with the **Work** performed hereunder (hereinafter referred to as the “beneficiary”) at the direction of the **City** or the **Contractor**.

20.3 The provisions of Article 20.2 are subject to the following limitations and conditions:

20.3.1 If the **Contractor** provides a payment bond for a value that is less than one hundred (100%) percent of the value of the **Contract Work**, the payment bond provided by the **Contractor** shall be primary (and non-contributing) to the payment guarantee provided under this Article 20.

20.3.2 The guarantee is made for the benefit of all beneficiaries as defined in Article 20.2 provided that those beneficiaries strictly adhere to the terms and conditions of Article 20.3.4 and 20.3.5.

20.3.3 Nothing in this Article 20 shall prevent a beneficiary providing labor, services or material for the **Work** from suing the **Contractor** for any amounts due and owing the beneficiary by the **Contractor**.

20.3.4 Every person who has furnished labor or material, to the **Contractor** or to a **Subcontractor** of the **Contractor**, in the prosecution of the **Work** and who has not been paid in full therefor before the expiration of a period of ninety (90) **Days** after the date on which the last of the labor was performed or material was furnished by him/her for which the claim is made, shall have the right to sue on this payment guarantee in his/her own name for the amount, or the balance thereof, unpaid at the time of commencement of the action; provided, however, that a person having a direct contractual relationship with a **Subcontractor** of the **Contractor** but no contractual relationship express or implied with the **Contractor** shall not have a right of action upon the guarantee unless he/she shall have given written notice to the **Contractor** within one hundred twenty (120) **Days** from the date on which the last of the labor was performed or the last of the material was furnished, for which his/her claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or for whom the labor was performed. The notice shall be served by delivering the same personally to the **Contractor** or by mailing the same by registered mail, postage prepaid, in an envelope addressed to the **Contractor** at any place where it maintains an office or conducts its business; provided, however, that where such notice is actually received by the **Contractor** by other means, such notice shall be deemed sufficient.

20.3.5 Except as provided in Labor Law Section 220-g, no action on this payment guarantee shall be commenced after the expiration of the one-year limitations period set forth in Section 137(4)(b) of the State Finance Law.

20.3.6 The **Contractor** shall promptly forward to the **City** any notice or demand received pursuant to Article 20.3.4. The **Contractor** shall inform the **City** of any defenses to the notice or demand and shall forward to the **City** any documents the **City** requests concerning the notice or demand.

20.3.7 All demands made against the **City** by a beneficiary of this payment guarantee shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems reasonably appropriate or necessary, which may include, but shall not be

limited to: the subcontract; any invoices presented to the **Contractor** for payment; the notarized statement of the beneficiary that the demand is due and payable, that a request for payment has been made of the **Contractor** and that the demand has not been paid by the **Contractor** within the time allowed for such payment by the subcontract; and copies of any correspondence between the beneficiary and the **Contractor** concerning such demand. The **City** shall notify the **Contractor** that a demand has been made. The **Contractor** shall inform the **City** of any defenses to the demand and shall forward to the **City** any documents the **City** requests concerning the demand.

20.3.8 The **City** shall make payment only if, after considering all defenses presented by the **Contractor**, it determines that the payment is due and owing to the beneficiary making the demand.

20.3.9 No beneficiary shall be entitled to interest from the **City**, or to any other costs, including, but not limited to, attorneys' fees, except to the extent required by State Finance Law Section 137.

20.3.10

20.4 Upon the receipt by the **City** of a demand pursuant to this Article 20, the **City** may withhold from any payment otherwise due and owing to the **Contractor** under this **Contract** an amount sufficient to satisfy the demand.

20.4.1 In the event the **City** determines that the demand is valid, the **City** shall notify the **Contractor** of such determination and the amount thereof and direct the **Contractor** to immediately pay such amount to the beneficiary. In the event the **Contractor**, within seven (7) **Days** of receipt of such notification from the **City**, fails to pay the beneficiary, such failure shall constitute an automatic and irrevocable assignment of payment by the **Contractor** to the beneficiary for the amount of the demand determined by the **City** to be valid. The **Contractor**, without further notification or other process, hereby gives its unconditional consent to such assignment of payment to the beneficiary and authorizes the **City**, on its behalf, to take all necessary actions to implement such assignment of payment, including without limitation the execution of any instrument or documentation necessary to effectuate such assignment.

20.4.2 In the event that the amount otherwise due and owing to the **Contractor** by the **City** is insufficient to satisfy such demand, the **City** may, at its option, require payment from the **Contractor** of an amount sufficient to cover such demand and exercise any other right to require or recover payment which the **City** may have under **Law** or **Contract**.

20.4.3 In the event the **City** determines that the demand is invalid, any amount withheld pending the **City**'s review of such demand shall be paid to the **Contractor**; provided, however, no lien has been filed. In the event a claim or an action has been filed, the terms and conditions set forth in Article 23 shall apply. In the event a lien has been filed, the parties will be governed by the provisions of the Lien Law of the State of New York.

20.5 The provisions of this Article 20 shall not prevent the **City** and the **Contractor** from resolving disputes in accordance with the **PPB** Rules, where applicable.

20.6 In the event the **City** determines that the beneficiary is entitled to payment pursuant to this Article 20, such determination and any defenses and counterclaims raised by the **Contractor** shall be taken into account in evaluating the **Contractor**'s performance.

20.7 Nothing in this Article 20 shall relieve the **Contractor** of the obligation to pay the claims of all

persons with valid and lawful claims against the **Contractor** relating to the **Work**.

20.8 The **Contractor** shall not require any performance, payment or other bonds of any **Subcontractor** if this **Contract** does not require such bonds of the **Contractor**.

20.9 The payment guarantee made pursuant to this Article 20 shall be construed in a manner consistent with Section 137 of the State Finance Law and shall afford to persons furnishing labor or materials to the **Contractor** or its **Subcontractors** in the prosecution of the **Work** under this **Contract** all of the rights and remedies afforded to such persons by such section, including but not limited to, the right to commence an action against the **City** on the payment guarantee provided by this Article 20 within the one-year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires one hundred (100%) percent performance and payment security, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.2 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded does not exceed one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded exceeds one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, up to ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher. The percentage to be retained is set forth in Schedule A of the General Conditions.

ARTICLE 22. INSURANCE

22.1 Types of Insurance: The **Contractor** shall procure and maintain the following types of insurance if, and as indicated, in Schedule A of the General Conditions (with the minimum limits and special conditions specified in Schedule A). Such insurance shall be maintained from the date the **Contractor** is required to provide Proof of Insurance pursuant to Article 22.3.1 through the date of completion of all required **Work** (including punch list work as certified in writing by the **Resident Engineer**), except for insurance required pursuant to Article 22.1.4, which may terminate upon **Substantial Completion** of the **Contract**. All insurance shall meet the requirements set forth in this Article 22. Wherever this Article requires that insurance coverage be “at least as broad” as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that the **Contractor** can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide Commercial General Liability Insurance covering claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this insurance shall be at least as broad as that provided by the latest edition of Insurance

Services Office (“ISO”) Form CG 0001. Such insurance shall be “occurrence” based rather than “claims-made” and include, without limitation, the following types of coverage: premises operations; products and completed operations; contractual liability (including the tort liability of another assumed in a contract); broad form property damage; independent contractors; explosion, collapse and underground (XCU); construction means and methods; and incidental malpractice. Such insurance shall contain a “per project” aggregate limit, as specified in Schedule A, that applies separately to operations under this **Contract**.

22.1.1(a) Such Commercial General Liability Insurance shall name the **City** as an Additional Insured. Coverage for the City shall specifically include the **City’s** officials and employees, be at least as broad as the latest edition of ISO Form CG 20 10 and provide completed operations coverage at least as broad as the latest edition of ISO Form CG 20 37.

22.1.1(b) Such Commercial General Liability Insurance shall name all other entities designated as additional insureds in Schedule A but only for claims arising from the **Contractor’s** operations under this **Contract**, with coverage at least as broad as the latest edition of ISO Form CG 20 26.

22.1.1(c) If the **Work** requires a permit from the Department of Buildings pursuant to 1 RCNY Section 101-08, the **Contractor** shall provide Commercial General Liability Insurance with limits of at least those required by 1 RCNY section 101-08 or greater limits required by the Agency in accordance with Schedule A. If the **Work** does not require such a permit, the minimum limits shall be those provided for in Schedule A.

22.1.1(d) If any of the **Work** includes repair of a waterborne vessel owned by or to be delivered to the **City**, such Commercial General Liability shall include, or be endorsed to include, Ship Repairer’s Legal Liability Coverage to protect against, without limitation, liability arising from navigation of such vessels prior to delivery to and acceptance by the **City**.

22.1.2 Workers’ Compensation Insurance, Employers’ Liability Insurance, and Disability Benefits Insurance: The **Contractor** shall provide, and shall cause its **Subcontractors** to provide, Workers Compensation Insurance, Employers’ Liability Insurance, and Disability Benefits Insurance in accordance with the **Laws** of the State of New York on behalf of all employees providing services under this **Contract** (except for those employees, if any, for which the **Laws** require insurance only pursuant to Article 22.1.3).

22.1.3 United States Longshoremen’s and Harbor Workers Act and/or Jones Act Insurance: If specified in Schedule A of the General Conditions or if required by **Law**, the **Contractor** shall provide insurance in accordance with the United States Longshoremen’s and Harbor Workers Act and/or the Jones Act, on behalf of all qualifying employees providing services under this **Contract**.

22.1.4 Builders Risk Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall provide Builders Risk Insurance on a completed value form for the total value of the **Work** through **Substantial Completion** of the **Work** in its entirety. Such insurance shall be provided on an All Risk basis and include coverage, without limitation, for windstorm (including named windstorm), storm surge, flood and earth movement. Unless waived by the **Commissioner**, it shall include coverage for ordinance and law, demolition and increased costs of construction, debris removal, pollutant clean up and removal, and expediting costs. Such insurance shall cover, without limitation, (a) all buildings and/or structures involved in the

Work, as well as temporary structures at the **Site**, and (b) any property that is intended to become a permanent part of such building or structure, whether such property is on the **Site**, in transit or in temporary storage. Policies shall name the **Contractor** as Named Insured and list the **City** as both an Additional Insured and a Loss Payee as its interest may appear.

22.1.4(a) Policies of such insurance shall specify that, in the event a loss occurs at an occupied facility, occupancy of such facility is permitted without the consent of the issuing insurance company.

22.1.4(b) Such insurance may be provided through an Installation Floater, at the **Contractor's** option, if it otherwise conforms with the requirements of this Article 22.1.4.

22.1.5 Commercial Automobile Liability Insurance: The **Contractor** shall provide Commercial Automobile Liability Insurance for liability arising out of ownership, maintenance or use of any owned (if any), non-owned and hired vehicles to be used in connection with this **Contract**. Coverage shall be at least as broad as the latest edition of ISO Form CA0001. If vehicles are used for transporting hazardous materials, the Automobile Liability Insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90.

22.1.6 Contractors Pollution Liability Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Contractors Pollution Liability Insurance covering bodily injury and property damage. Such insurance shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants (including asbestos), including any loss, cost or expense incurred as a result of any cleanup of pollutants (including asbestos) or in the investigation, settlement or defense of any claim, action, or proceedings arising from the operations under this **Contract**. Such insurance shall be in the **Contractor's** name and list the **City** as an Additional Insured and any other entity specified in Schedule A. Coverage shall include, without limitation, (a) loss of use of damaged property or of property that has not been physically injured, (b) transportation, and (c) non-owned disposal sites.

22.1.6(a) Coverage for the **City** as Additional Insured shall specifically include the **City's** officials and employees and be at least as broad as provided to the **Contractor** for this **Project**.

22.1.6(b) If such insurance is written on a claims-made policy, such policy shall have a retroactive date on or before the effective date of this **Contract**, and continuous coverage shall be maintained, or an extended discovery period exercised, for a period of not less than three (3) years from the time the **Work** under this **Contract** is completed.

22.1.7 Marine Insurance:

22.1.7(a) Marine Protection and Indemnity Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Marine Protection and Indemnity Insurance with coverage at least as broad as Form SP-23. The insurance shall provide coverage for the **Contractor** or **Subcontractor** (whichever is doing this **Work**) and for the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured for bodily injury and property damage arising from marine operations under this

Contract. Coverage shall include, without limitation, injury or death of crew members (if not fully provided through other insurance), removal of wreck, damage to piers, wharves and other fixed or floating objects and loss of or damage to any other vessel or craft, or to property on such other vessel or craft.

22.1.7(b) Hull and Machinery Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Hull and Machinery Insurance with coverage for the **Contractor** or **Subcontractor** (whichever is doing this Work) and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the latest edition of American Institute Tug Form for all tugs used under this **Contract** and Collision Liability at least as broad as the latest edition of American Institute Hull Clauses.

22.1.7(c) Marine Pollution Liability Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such Work to maintain, Marine Pollution Liability Insurance covering itself (or the Subcontractor doing such Work) as Named Insured and the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured. Coverage shall be at least as broad as that provided by the latest edition of Water Quality Insurance Syndicate Form and include, without limitation, liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources.

22.1.8 The **Contractor** shall provide such other types of insurance, at such minimum limits and with such conditions, as are specified in Schedule A of the General Conditions.

22.2 General Requirements for Insurance Coverage and Policies:

22.2.1 All required insurance policies shall be maintained with companies that may lawfully issue the required policy and have an A.M. Best rating of at least A-/VII or a Standard and Poor's rating of at least A, unless prior written approval is obtained from the **City** Corporation Counsel.

22.2.2 The **Contractor** shall be solely responsible for the payment of all premiums for all required policies and all deductibles and self-insured retentions to which such policies are subject, whether or not the **City** is an insured under the policy.

22.2.3 In his/her sole discretion, the **Commissioner** may, subject to the approval of the **Comptroller** and the **City** Corporation Counsel, accept Letters of Credit and/or custodial accounts in lieu of required insurance.

22.2.4 The **City's** limits of coverage for all types of insurance required pursuant to Schedule A of the General Conditions shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the **Contractor** as Named Insured under all primary, excess, and umbrella policies of that type of coverage.

22.2.5 The **Contractor** may satisfy its insurance obligations under this Article 22 through primary policies or a combination of primary and excess/umbrella policies, so long as all policies provide the scope of coverage required herein.

22.2.6 Policies of insurance provided pursuant to this Article 22 shall be primary and non-contributing to any insurance or self-insurance maintained by the **City**.

22.3 Proof of Insurance:

22.3.1 For all types of insurance required by Article 22.1 and Schedule A, except for insurance required by Articles 22.1.4 and 22.1.7, the **Contractor** shall file proof of insurance in accordance with this Article 22.3 within ten (10) **Days** of award. For insurance provided pursuant to Articles 22.1.4 and 22.1.7, proof shall be filed by a date specified by the **Commissioner** or ten (10) **Days** prior to the commencement of the portion of the **Work** covered by such policy, whichever is earlier.

22.3.2 For Workers' Compensation Insurance provided pursuant to Article 22.1.2, the **Contractor** shall submit one of the following forms: C-105.2 Certificate of Workers' Compensation Insurance; U-26.3 - State Insurance Fund Certificate of Workers' Compensation Insurance; Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. For Disability Benefits Insurance provided pursuant to Article 22.1.2, the Contractor shall submit DB-120.1 - Certificate Of Insurance Coverage Under The NYS Disability Benefits Law, Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. ACORD forms are not acceptable.

22.3.3 For policies provided pursuant to all of Article 22.1 other than Article 22.1.2, the **Contractor** shall submit one or more Certificates of Insurance on forms acceptable to the **Commissioner**. All such Certificates of Insurance shall certify (a) the issuance and effectiveness of such policies of insurance, each with the specified minimum limits (b) for insurance secured pursuant to Article 22.1.1 that the **City** and any other entity specified in Schedule A is an Additional Insured thereunder; (c) in the event insurance is required pursuant to Article 22.1.6 and/or Article 22.1.7, that the City is an Additional Insured thereunder; (d) the company code issued to the insurance company by the National Association of Insurance Commissioners (the NAIC number); and (e) the number assigned to the **Contract** by the **City**. All such Certificates of Insurance shall be accompanied by either a duly executed "Certification by Insurance Broker or Agent" in the form contained in Part III of Schedule A or copies of all policies referenced in such Certificate of Insurance as certified by an authorized representative of the issuing insurance carrier. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

22.3.4 Documentation confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such proofs of insurance shall comply with the requirements of Articles 22.3.2 and 22.3.3.

22.3.5 The **Contractor** shall be obligated to provide the **City** with a copy of any policy of insurance provided pursuant to this Article 22 upon the demand for such policy by the **Commissioner** or the **City** Corporation Counsel.

22.4 Operations of the **Contractor**:

22.4.1 The **Contractor** shall not commence the **Work** unless and until all required certificates have been submitted to and accepted by the **Commissioner**. Acceptance by the

Commissioner of a certificate does not excuse the **Contractor** from securing insurance consistent with all provisions of this Article 22 or of any liability arising from its failure to do so.

22.4.2 The **Contractor** shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this **Contract** and shall be authorized to perform **Work** only during the effective period of all required coverage.

22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the **Contractor** shall immediately stop all **Work**, and shall not recommence **Work** until authorized in writing to do so by the **Commissioner**. Upon quitting the **Site**, except as otherwise directed by the **Commissioner**, the **Contractor** shall leave all plant, materials, equipment, tools, and supplies on the **Site**. **Contract** time shall continue to run during such periods and no extensions of time will be granted. The **Commissioner** may also declare the **Contractor** in default for failure to maintain required insurance.

22.4.4 In the event the **Contractor** receives notice, from an insurance company or other person, that any insurance policy required under this Article 22 shall be cancelled or terminated (or has been cancelled or terminated) for any reason, the **Contractor** shall immediately forward a copy of such notice to both the **Commissioner** and the New York City Comptroller, attn: Office of Contract Administration, Municipal Building, One Centre Street, room 1005, New York, New York 10007. Notwithstanding the foregoing, the **Contractor** shall ensure that there is no interruption in any of the insurance coverage required under this Article 22.

22.4.5 Where notice of loss, damage, occurrence, accident, claim or suit is required under an insurance policy maintained in accordance with this Article 22, the **Contractor** shall notify in writing all insurance carriers that issued potentially responsive policies of any such event relating to any operations under this **Contract** (including notice to Commercial General Liability insurance carriers for events relating to the **Contractor**'s own employees) no later than 20 days after such event. For any policy where the **City** is an Additional Insured, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Insured as well as the Named Insured." Such notice shall also contain the following information: the number of the insurance policy, the name of the named insured, the date and location of the damage, occurrence, or accident, and the identity of the persons or things injured, damaged or lost. The **Contractor** shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

22.4.6 In the event of any loss, accident, claim, action, or other event that does or can give rise to a claim under any insurance policy required under this Article 22, the **Contractor** shall at all times fully cooperate with the **City** with regard to such potential or actual claim.

22.5 **Subcontractor Insurance**: In the event the **Contractor** requires any **Subcontractor** to procure insurance with regard to any operations under this **Contract** and requires such **Subcontractor** to name the **Contractor** as an **Additional Insured** thereunder, the **Contractor** shall ensure that the **Subcontractor** name the **City**, including its officials and employees, as an Additional Insured with coverage at least as broad as the most recent edition of ISO Form CG 20 26.

22.6 Wherever reference is made in Article 7 or this Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth in Schedule A of the General Conditions. In the event no address is set forth in Schedule A, such documents

are to be sent to the **Commissioner's** address as provided elsewhere in this **Contract**.

22.7 Apart from damages or losses covered by insurance provided pursuant to Articles 22.1.2, 22.1.3, or 22.1.5, the **Contractor** waives all rights against the **City**, including its officials and employees, for any damages or losses that are covered under any insurance required under this Article 22 (whether or not such insurance is actually procured or claims are paid thereunder) or any other insurance applicable to the operations of the **Contractor** and/or its employees, agents, or **Subcontractors**.

22.8 In the event the **Contractor** utilizes a self-insurance program to satisfy any of the requirements of this Article 22, the **Contractor** shall ensure that any such self-insurance program provides the **City** with all rights that would be provided by traditional insurance under this Article 22, including but not limited to the defense and indemnification obligations that insurers are required to undertake in liability policies.

22.9 Materiality/Non-Waiver: The **Contractor's** failure to secure policies in complete conformity with this Article 22, or to give an insurance company timely notice of any sort required in this **Contract** or to do anything else required by this Article 22 shall constitute a material breach of this **Contract**. Such breach shall not be waived or otherwise excused by any action or inaction by the **City** at any time.

22.10 Pursuant to General Municipal Law Section 108, this **Contract** shall be void and of no effect unless **Contractor** maintains Workers' Compensation Insurance for the term of this **Contract** to the extent required and in compliance with the New York State Workers' Compensation Law.

22.11 Other Remedies: Insurance coverage provided pursuant to this Article 22 or otherwise shall not relieve the **Contractor** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions available to it under any other provisions of this **Contract** or **Law**.

ARTICLE 23. MONEY RETAINED AGAINST CLAIMS

23.1 If any claim shall be made by any person or entity (including **Other Contractors** with the **City** on this **Project**) against the **City** or against the **Contractor** and the **City** for any of the following:

- (a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the **City**, which in the opinion of the **Comptroller** may not be paid by an insurance company (for any reason whatsoever); or
- (b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or
- (c) Damage claimed to have been caused directly or indirectly by the failure of the **Contractor** to perform the **Work** in strict accordance with this **Contract**,

the amount of such claim, or so much thereof as the **Comptroller** may deem necessary, may be withheld by the **Comptroller**, as security against such claim, from any money due hereunder. The **Comptroller**, in his/her discretion, may permit the **Contractor** to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the **City**, or the **Contractor**,

or both, shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the **Contractor** to be valid, the **Comptroller** shall pay such judgment or admitted claim out of the monies retained by the **Comptroller** under the provisions of this Article 23, and return the balance, if any, without interest, to the **Contractor**.

ARTICLE 24. MAINTENANCE AND GUARANTY

24.1 The **Contractor** shall promptly repair, replace, restore or rebuild, as the **Commissioner** may determine, any finished **Work** in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of **Substantial Completion** (or use and occupancy in accordance with Article 16), except where other periods of maintenance and guaranty are provided for in Schedule A.

24.2 As security for the faithful performance of its obligations hereunder, the **Contractor**, upon filing its requisition for payment on **Substantial Completion**, shall deposit with the **Commissioner** a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the **Comptroller**, or obligations of the **City**, which the **Comptroller** may approve as of equal value with the sum so required.

24.3 In lieu of the above, the **Contractor** may make such security payment to the **City** by authorizing the **Commissioner** in writing to deduct the amount from the **Substantial Completion** payment which shall be deemed the deposit required above.

24.4 If the **Contractor** has faithfully performed all of its obligations hereunder the **Commissioner** shall so certify to the **Comptroller** within five (5) **Days** after the expiration of one (1) year from the date of **Substantial Completion** and acceptance of the **Work** or within thirty (30) **Days** after the expiration of the guarantee period fixed in the **Specifications**. The security payment shall be repaid to the **Contractor** without interest within thirty (30) **Days** after certification by the **Commissioner** to the **Comptroller** that the **Contractor** has faithfully performed all of its obligations hereunder.

24.5 Notice by the **Commissioner** to the **Contractor** to repair, replace, rebuild or restore such defective or damaged **Work** shall be timely, pursuant to this article, if given not later than ten (10) **Days** subsequent to the expiration of the one (1) year period or other periods provided for herein.

24.6 If the **Contractor** shall fail to repair, replace, rebuild or restore such defective or damaged **Work** promptly after receiving such notice, the **Commissioner** shall have the right to have the **Work** done by others in the same manner as provided for in the completion of a defaulted **Contract**, under Article 51.

24.7 If the security payment so deposited is insufficient to cover the cost of such **Work**, the **Contractor** shall be liable to pay such deficiency on demand by the **Commissioner**.

24.8 The **Engineer's** certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective **Work** when performed by one other than the **Contractor**, shall be binding and conclusive upon the **Contractor** as to the amount thereof.

24.9 The **Contractor** shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this **Contract** in the name of the **City** and shall deliver same to the **Commissioner**. All of the **City's** rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the **City** to any subsequent purchasers of such equipment and materials or lessees of the

premises into which the equipment and materials have been installed.

CHAPTER VI: CHANGES, EXTRA WORK, AND DOCUMENTATION OF CLAIM

ARTICLE 25. CHANGES

25.1 Changes may be made to this **Contract** only as duly authorized in writing by the **Commissioner** in accordance with the **Law** and this **Contract**. All such changes, modifications, and amendments will become a part of the **Contract**. **Work** so ordered shall be performed by the **Contractor**.

25.2 **Contract** changes will be made only for **Work** necessary to complete the **Work** included in the original scope of the **Contract** and/or for non-material changes to the scope of the **Contract**. Changes are not permitted for any material alteration in the scope of **Work** in the **Contract**.

25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:

25.3.1 By applicable unit prices specified in the **Contract**; and/or

25.3.2 By agreement of a fixed price; and/or

25.3.3 By time and material records; and/or

25.3.4 In any other manner approved by the **CCPO**.

25.4 All payments for change orders are subject to pre-audit by the **Engineering Audit Officer** and may be post-audited by the **Comptroller** and/or the **Agency**.

ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK

26.1 **Overrun of Unit Price Item**: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.

26.1.1 For any unit price item, the **Contractor** will be paid at the unit price bid for any quantity up to one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule. If during the progress of the **Work**, the actual quantity of any unit price item required to complete the **Work** approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the **Work** will exceed the estimated quantity for that item by twenty-five (25%) percent, the **Contractor** shall immediately notify the **Engineer** of such anticipated overrun. The **Contractor** shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule without written authorization from the **Engineer**.

26.1.2 If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of the item on the

basis of time and material records for the actual and reasonable cost as determined under Article 26.2, but in no event at a unit price exceeding the unit price bid.

26.2 **Extra Work:** For **Extra Work** where payment is by agreement on a fixed price in accordance with Article 25.3.2, the price to be paid for such **Extra Work** shall be based on the fair and reasonable estimated cost of the items set forth below. For **Extra Work** where payment is based on time and material records in accordance with Article 25.3.3, the price to be paid for such **Extra Work** shall be the actual and reasonable cost of the items set forth below, calculated in accordance with the formula specified therein, if any.

26.2.1 Necessary materials (including transportation to the **Site**); plus

26.2.2 Necessary direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits; plus

26.2.3 Sales and personal property taxes, if any, required to be paid on materials not incorporated into such **Extra Work**; plus

26.2.4 Reasonable rental value of **Contractor**-owned (or **Subcontractor**-owned, as applicable), necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by Equipment Watch (the "Green Book"), or seventy-five percent of the monthly prorated rental rates established in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Watch (the "Blue Book") (the applicable Blue Book rate being for rental only without the addition of any operational costs listed in the Blue Book). The reasonable rental value is deemed to be inclusive of all operating costs except for fuel/energy consumption and equipment operator's wages/costs. For multiple shift utilization, reimbursement shall be calculated as follows: first shift shall be seventy-five (75%) percent of such rental rates; second shift shall be sixty (60%) percent of the first shift rate; and third shift shall be forty (40%) percent of the first shift rate. Equipment on standby shall be reimbursed at one-third (1/3) the prorated monthly rental rate. **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment includes equipment from rental companies affiliated with or controlled by the **Contractor** (or **Subcontractor**, as applicable), as determined by the **Commissioner**. In establishing cost reimbursement for non-operating **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment (scaffolding, sheeting systems, road plates, etc.), the **City** may restrict reimbursement to a purchase-salvage/life cycle basis if less than the computed rental costs; plus

26.2.5 Necessary installation and dismantling of such plant and equipment, including transportation to and from the **Site**, if any, provided that, in the case of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) equipment rented from a third party, the cost of installation and dismantling are not allowable if such costs are included in the rental rate; plus

26.2.6 Necessary fees charged by governmental entities; plus

26.2.7 Necessary construction-related service fees charged by non-governmental entities, such as landfill tipping fees; plus

26.2.8 Reasonable rental costs of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. In lieu of renting, the **City** reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.9 Workers' Compensation Insurance, and any insurance coverage expressly required by the **City** for the performance of the **Extra Work** which is different than the types of insurance required by Article 22 and Schedule A of the General Conditions. The cost of Workers' Compensation Insurance is subject to applicable payroll limitation caps and shall be based upon the carrier's Manual Rate for such insurance derived from the applicable class Loss Cost ("LC") and carrier's Lost Cost Multiplier ("LCM") approved by the New York State Department of Financial Services, and with the exception of experience rating, rate modifiers as promulgated by the New York Compensation Insurance Rating Board ("NYCIRB"); plus

26.2.10 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.11 Twelve percent (12%) percent of the total of items in Articles 26.2.1 through 26.2.5 as compensation for overhead, except that no percentage for overhead will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes. Overhead shall include without limitation, all costs and expenses in connection with administration, management superintendence, small tools, and insurance required by Schedule A of the General Conditions other than Workers' Compensation Insurance; plus

26.2.12 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus the items in Article 26.2.11, as compensation for profit, except that no percentage for profit will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes; plus

26.2.13 Five (5%) percent of the total of items in Articles 26.2.6 through 26.2.10 as compensation for overhead and profit.

26.3 Where the **Extra Work** is performed in whole or in part by other than the **Contractor's** own forces pursuant to Article 26.2, the **Contractor** shall be paid, subject to pre-audit by the **Engineering Audit Officer**, the cost of such **Work** computed in accordance with Article 26.2 above, plus an additional allowance of five (5%) percent to cover the **Contractor's** overhead and profit.

26.4 Where a change is ordered, involving both **Extra Work** and omitted or reduced **Contract Work**, the **Contract** price shall be adjusted, subject to pre-audit by the **EAO**, in an amount based on the difference between the cost of such **Extra Work** and of the omitted or reduced **Work**.

26.5 Where the **Contractor** and the **Commissioner** can agree upon a fixed price for **Extra Work** in accordance with Article 25.3.2 or another method of payment for **Extra Work** in accordance with Article 25.3.4, or for **Extra Work** ordered in connection with omitted **Work**, such method, subject to pre-audit by the **EAO**, may, at the option of the **Commissioner**, be substituted for the cost plus a percentage method provided in Article 26.2; provided, however, that if the **Extra Work** is performed by a **Subcontractor**, the **Contractor** shall not be entitled to receive more than an additional allowance of five (5%) percent for overhead and profit over

the cost of such **Subcontractor's Work** as computed in accordance with Article 26.2.

ARTICLE 27. RESOLUTION OF DISPUTES

27.1 All disputes between the **City** and the **Contractor** of the kind delineated in this Article 27.1 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this Article 27 and the **PPB** Rules. This procedure for resolving all disputes of the kind delineated herein shall be the exclusive means of resolving any such disputes.

27.1.1 This Article 27 shall not apply to disputes concerning matters dealt with in other sections of the **PPB** Rules, or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software.

27.1.2 This Article 27 shall apply only to disputes about the scope of **Work** delineated by the **Contract**, the interpretation of **Contract** documents, the amount to be paid for **Extra Work** or disputed work performed in connection with the **Contract**, the conformity of the **Contractor's Work** to the **Contract**, and the acceptability and quality of the **Contractor's Work**; such disputes arise when the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** makes a determination with which the **Contractor** disagrees.

27.2 All determinations required by this Article 27 shall be made in writing clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this Article 27 shall be deemed a non-determination without prejudice that will allow application to the next level.

27.3 During such time as any dispute is being presented, heard, and considered pursuant to this Article 27, the **Contract** terms shall remain in force and the **Contractor** shall continue to perform **Work** as directed by the **ACCO** or the **Engineer**. Failure of the **Contractor** to continue **Work** as directed shall constitute a waiver by the **Contractor** of its claim.

27.4 Presentation of Disputes to **Commissioner**.

Notice of Dispute and Agency Response. The **Contractor** shall present its dispute in writing ("Notice of Dispute") to the **Commissioner** within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the **Contract**. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the **Contractor** relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the **Contractor** in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** shall submit to the **Commissioner** all materials he or she deems pertinent to the dispute. Following initial submissions to the **Commissioner**, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

27.4.1 **Commissioner Inquiry.** The **Commissioner** shall examine the material and may, in his or her discretion, convene an informal conference with the **Contractor**, the **ACCO**, and the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** to resolve the issue by mutual consent prior to reaching a determination. The **Commissioner** may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The **Commissioner's** ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the dispute presented, whether or not the **Commissioner** participated therein. The **Commissioner** may or, at the request of any party to the dispute, shall compel the participation of any **Other Contractor** with a contract related to the **Work** of this **Contract**, and that **Contractor** shall be bound by the decision of the **Commissioner**. Any **Other Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this Article 27 as the **Contractor** initiating the dispute.

27.4.2 **Commissioner Determination.** Within thirty (30) **Days** after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the **Commissioner** shall make his or her determination and shall deliver or send a copy of such determination to the **Contractor**, the **ACCO**, and **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner**, as applicable, together with a statement concerning how the decision may be appealed.

27.4.3 **Finality of Commissioner's Decision.** The **Commissioner's** decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board pursuant to this Article 27. The **City** may not take a petition to the Contract Dispute Resolution Board. However, should the **Contractor** take such a petition, the **City** may seek, and the Contract Dispute Resolution Board may render, a determination less favorable to the **Contractor** and more favorable to the **City** than the decision of the **Commissioner**.

27.5 **Presentation of Dispute to the Comptroller.** Before any dispute may be brought by the **Contractor** to the Contract Dispute Resolution Board, the **Contractor** must first present its claim to the **Comptroller** for his or her review, investigation, and possible adjustment.

27.5.1 **Time, Form, and Content of Notice.** Within thirty (30) **Days** of its receipt of a decision by the **Commissioner**, the **Contractor** shall submit to the **Comptroller** and to the **Commissioner** a Notice of Claim regarding its dispute with the **Agency**. The Notice of Claim shall consist of (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written decision of the **Commissioner**; and (iii) a copy of all materials submitted by the **Contractor** to the **Agency**, including the Notice of Dispute. The **Contractor** may not present to the **Comptroller** any material not presented to the **Commissioner**, except at the request of the **Comptroller**.

27.5.2 Response. Within thirty (30) **Days** of receipt of the Notice of Claim, the **Agency** shall make available to the **Comptroller** a copy of all material submitted by the **Agency** to the **Commissioner** in connection with the dispute. The **Agency** may not present to the **Comptroller** any material not presented to the **Commissioner** except at the request of the **Comptroller**.

27.5.3 **Comptroller** Investigation. The **Comptroller** may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in Sections 7-201 and 7-203 of the Administrative Code. In addition, the **Comptroller** may demand of either party, and such party shall provide, whatever additional material the **Comptroller** deems pertinent to the claim, including original business records of the **Contractor**. Willful failure of the **Contractor** to produce within fifteen (15) **Days** any material requested by the **Comptroller** shall constitute a waiver by the **Contractor** of its claim. The **Comptroller** may also schedule an informal conference to be attended by the **Contractor**, **Agency** representatives, and any other personnel desired by the **Comptroller**.

27.5.4 Opportunity of **Comptroller** to Compromise or Adjust Claim. The **Comptroller** shall have forty-five (45) **Days** from his or her receipt of all materials referred to in Article 27.5.3 to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the **Contractor** and the **Comptroller**, to a maximum of ninety (90) **Days** from the **Comptroller's** receipt of all materials. The **Contractor** may not present its petition to the Contract Dispute Resolution Board until the period for investigation and compromise delineated in this Article 27.5.4 has expired. In compromising or adjusting any claim hereunder, the **Comptroller** may not revise or disregard the terms of the **Contract** between the parties.

27.6 Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:

27.6.1 The chief administrative law judge of the Office of Administrative Trials and Hearings (OATH) or his/her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this Article 27 as may be necessary in the execution of the Contract Dispute Resolution Board's functions, including, but not limited to, granting extensions of time to present or respond to submissions;

27.6.2 The **CCPO** or his/her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and

27.6.3 A person with appropriate expertise who is not an employee of the **City**. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established and administered by OATH with appropriate background to act as decision-makers in a dispute. Such individual may not have a contract or dispute with the **City** or be an officer or employee of any company or organization that does, or regularly represents persons, companies, or organizations having disputes with the **City**.

27.7 Petition to the Contract Dispute Resolution Board. In the event the claim has not been settled or adjusted by the **Comptroller** within the period provided in this Article 27, the **Contractor**, within thirty (30) **Days** thereafter, may petition the Contract Dispute Resolution Board to review the

Commissioner's determination.

27.7.1 **Form and Content of Petition by Contractor.** The **Contractor** shall present its dispute to the Contract Dispute Resolution Board in the form of a petition, which shall include (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written Decision of the **Commissioner**, (iii) copies of all materials submitted by the **Contractor** to the Agency; (iv) a copy of the written decision of the **Comptroller**, if any, and (v) copies of all correspondence with, or written material submitted by the **Contractor**, to the **Comptroller**. The **Contractor** shall concurrently submit four (4) complete sets of the Petition: one set to the **City** Corporation Counsel (Attn: Commercial and Real Estate Litigation Division) and three (3) sets to the Contract Dispute Resolution Board at OATH's offices with proof of service on the **City** Corporation Counsel. In addition, the **Contractor** shall submit a copy of the written statement of the substance of the dispute, cited in (i) above, to both the **Commissioner** and the **Comptroller**.

27.7.2 **Agency Response.** Within thirty (30) **Days** of its receipt of the Petition by the **City** Corporation Counsel, the **Agency** shall respond to the brief written statement of the **Contractor** and make available to the Contract Dispute Resolution Board all material it submitted to the **Commissioner** and **Comptroller**. Three (3) complete copies of the **Agency** response shall be provided to the Contract Dispute Resolution Board and one to the **Contractor**. Extensions of time for submittal of the **Agency** response shall be given as necessary upon a showing of good cause or, upon consent of the parties, for an initial period of up to thirty (30) **Days**.

27.7.3 **Further Proceedings.** The Contract Dispute Resolution Board shall permit the **Contractor** to present its case by submission of memoranda, briefs, and oral argument. The Contract Dispute Resolution Board shall also permit the **Agency** to present its case in response to the **Contractor** by submission of memoranda, briefs, and oral argument. If requested by the **City** Corporation Counsel, the **Comptroller** shall provide reasonable assistance in the preparation of the **Agency's** case. Neither the **Contractor** nor the **Agency** may support its case with any documentation or other material that was not considered by the **Comptroller**, unless requested by the Contract Dispute Resolution Board. The Contract Dispute Resolution Board, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The Contract Dispute Resolution Board, in its discretion, may combine more than one dispute between the parties for concurrent resolution.

27.7.4 **Contract Dispute Resolution Board Determination.** Within forty-five (45) **Days** of the conclusion of all written submissions and oral arguments, the Contract Dispute Resolution Board shall render a written decision resolving the dispute. In an unusually complex case, the Contract Dispute Resolution Board may render its decision in a longer period, not to exceed ninety (90) **Days**, and shall so advise the parties at the commencement of this period. The Contract Dispute Resolution Board's decision must be consistent with the terms of the **Contract**. Decisions of the Contract Dispute Resolution Board shall only resolve matters before the Contract Dispute Resolution Board and shall not have precedential effect with respect to matters not before the Contract Dispute Resolution Board.

27.7.5 **Notification of Contract Dispute Resolution Board Decision.** The Contract Dispute Resolution Board shall send a copy of its decision to the **Contractor**, the **ACCO**, the Engineer, the **Comptroller**, the **City** Corporation Counsel, the CCPO, and the **PPB**. A decision in favor of the **Contractor** shall be subject to the prompt payment provisions of the **PPB** Rules. The

Required Payment Date shall be thirty (30) Days after the date the parties are formally notified of the Contract Dispute Resolution Board's decision.

27.7.6 Finality of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board's decision shall be final and binding on all parties. Any party may seek review of the Contract Dispute Resolution Board's decision solely in the form of a challenge, filed within four (4) months of the date of the Contract Dispute Resolution Board's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Law and Rules. Such review by the court shall be limited to the question of whether or not the Contract Dispute Resolution Board's decision was made in violation of lawful procedure, was affected by an error of **Law**, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the Contract Dispute Resolution Board in accordance with this Article 27.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this Article 27 shall not affect or impair the ability of the **Commissioner** or Contract Dispute Resolution Board to make a binding and final decision pursuant to this Article 27.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK OR WORK ON A TIME & MATERIALS BASIS

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Work** on a time and material basis or **Extra Work** on a time and material basis ordered by the **Commissioner** under Article 25, or where the **Contractor** believes that it or any of its **Subcontractors** is performing **Extra Work** but a final determination by **Agency** has not been made, or the **Contractor** or any of its **Subcontractors** is performing disputed **Work** (whether on or off the **Site**), or complying with a determination or order under protest in accordance with Articles 11, 27, and 30, in each such case the **Contractor** shall furnish the **Resident Engineer** daily with three (3) copies of written statements signed by the **Contractor's** representative at the **Site** showing:

28.1.1 The name, trade, and number of each worker employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and

28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.

28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) **Days** after submission.

28.3 The **Contractor** and its **Subcontractors**, when required by the **Commissioner**, or the **Comptroller**, shall also produce for inspection, at the office of the **Contractor** or **Subcontractor**, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports, and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such **Work**, or in complying with such determination or order, and the amounts expended therefor, and shall permit the **Commissioner** and the

Comptroller to make such extracts therefrom, or copies thereof, as they or either of them may desire.

28.4 In connection with the examination provided for herein, the **Commissioner**, upon demand therefor, will produce for inspection by the **Contractor** such records as the **Agency** may have with respect to such **Extra Work** or disputed **Work** performed under protest pursuant to order of the **Commissioner**, except those records and reports which may have been prepared for the purpose of determining the accuracy and validity of the **Contractor's** claim.

28.5 Failure to comply strictly with these requirements shall constitute a waiver of any claim for extra compensation or damages on account of the performance of such **Work** or compliance with such determination or order.

ARTICLE 29. OMITTED WORK

29.1 If any **Contract Work** in a lump sum **Contract**, or if any part of a lump sum item in a unit price, lump sum, or percentage-bid **Contract** is omitted by the **Commissioner** pursuant to Article 33, the **Contract** price, subject to audit by the EAO, shall be reduced by a pro rata portion of the lump sum bid amount based upon the percent of **Work** omitted subject to Article 29.4. For the purpose of determining the pro rata portion of the lump sum bid amount, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be the determining factor.

29.2 If the whole of a lump sum item or units of any other item is so omitted by the **Commissioner** in a unit price, lump sum, or percentage-bid **Contract**, then no payment will be made therefor except as provided in Article 29.4.

29.3 For units that have been ordered but are only partially completed, the unit price shall be reduced by a pro rata portion of the unit price bid based upon the percentage of **Work** omitted subject to Article 29.4.

29.4 In the event the **Contractor**, with respect to any omitted **Work**, has purchased any non-cancelable material and/or equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated into the **Work**, the **Contractor** shall be paid for such material and/or equipment in accordance with Article 64.2.1(b); provided, however, such payment is contingent upon the **Contractor's** delivery of such material and/or equipment in acceptable condition to a location designated by the **City**.

29.5 The **Contractor** agrees to make no claim for damages or for loss of overhead and profit with regard to any omitted **Work**.

ARTICLE 30. NOTICE AND DOCUMENTATION OF COSTS AND DAMAGES; PRODUCTION OF FINANCIAL RECORDS

30.1 If the **Contractor** shall claim to be sustaining damages by reason of any act or omission of the **City** or its agents, it shall submit to the **Commissioner** within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter to the extent additional damages are being incurred for the same condition, verified statements of the details and the amounts of such damages, together with documentary evidence of such damages. The **Contractor** may submit any of the above statements within such additional time as may be granted by the **Commissioner** in writing upon written request therefor. Failure of the **Commissioner** to respond in writing to a written request for additional time within thirty (30) **Days** shall be deemed a denial of the request. On failure of the **Contractor** to strictly comply with

the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the **Contractor** may claim in any action or dispute resolution procedure arising under or by reason of this **Contract** shall not be different from or in excess of the statements and documentation made pursuant to this Article 30. This Article 30.1 does not apply to claims submitted to the **Commissioner** pursuant to Article 11 or to claims disputing a determination under Article 27.

30.2 In addition to the foregoing statements, the **Contractor** shall, upon notice from the **Commissioner**, produce for examination at the **Contractor's** office, by the **Engineer, Architect or Project Manager**, all of its books of account, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**, and submit itself and persons in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.3 In addition to the statements required under Article 28 and this Article 30, the **Contractor** and/or its **Subcontractor** shall, within thirty (30) **Days** upon notice from the **Commissioner** or **Comptroller**, produce for examination at the **Contractor's** and/or **Subcontractor's** office, by a representative of either the **Commissioner** or **Comptroller**, all of its books of account, bid documents, financial statements, accountant workpapers, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**. Further, the **Contractor** and/or its **Subcontractor** shall submit any person in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.4 Unless the information and examination required under Article 30.3 is provided by the **Contractor** and/or its **Subcontractor** upon thirty (30) **Days'** notice from the **Commissioner** or **Comptroller**, or upon the **Commissioner's** or **Comptroller's** written authorization to extend the time to comply, the **City** shall be released from all claims arising under, relating to or by reason of this **Contract**, except for sums certified by the **Commissioner** to be due under the provisions of this **Contract**. It is further stipulated and agreed that no person has the power to waive any of the foregoing provisions and that in any action or dispute resolution procedure against the **City** to recover any sum in excess of the sums certified by the **Commissioner** to be due under or by reason of this **Contract**, the **Contractor** must allege in its complaint and prove, at trial or during such dispute resolution procedure, compliance with the provisions of this Article 30.

30.5 In addition, after the commencement of any action or dispute resolution procedure by the **Contractor** arising under or by reason of this **Contract**, the **City** shall have the right to require the **Contractor** to produce for examination under oath, up until the trial of the action or hearing before the Contract Dispute Resolution Board, the books and documents described in Article 30.3 and submit itself and all persons in its employ for examination under oath. If this Article 30 is not complied with as required, then the **Contractor** hereby consents to the dismissal of the action or dispute resolution procedure.

CHAPTER VII: POWERS OF THE RESIDENT ENGINEER, THE ENGINEER OR ARCHITECT AND THE COMMISSIONER

ARTICLE 31. THE RESIDENT ENGINEER

31.1 The **Resident Engineer** shall have the power to inspect, supervise, and control the performance

of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER

32.1 The **Engineer** or **Architect** or **Project Manager**, in addition to those matters elsewhere herein delegated to the **Engineer** and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the **Commissioner**:

32.1.1 To determine the amount, quality, and location of the **Work** to be paid for hereunder; and

32.1.2 To determine all questions in relation to the **Work**, to interpret the **Contract Drawings, Specifications, and Addenda**, and to resolve all patent inconsistencies or ambiguities therein; and

32.1.3 To determine how the **Work** of this **Contract** shall be coordinated with **Work** of **Other Contractors** engaged simultaneously on this **Project**, including the power to suspend any part of the **Work**, but not the whole thereof; and

32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and

32.1.5 To amplify the **Contract Drawings**, add explanatory information and furnish additional **Specifications** and drawings, consistent with this **Contract**.

32.2 The foregoing enumeration shall not imply any limitation upon the power of the **Engineer** or **Architect** or **Project Manager**, for it is the intent of this **Contract** that all of the **Work** shall generally be subject to his/her determination, direction, and approval, except where the determination, direction or approval of someone other than the **Engineer** or **Architect** or **Project Manager** is expressly called for herein.

32.3 The **Engineer** or **Architect** or **Project Manager** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 33. THE COMMISSIONER

33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:

33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and

33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and

33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:

33.1.3(a) In the interest of the **City** generally; or

33.1.3(b) To coordinate the **Work** of the various contractors engaged on this **Project** pursuant to the provisions of Article 12; or

33.1.3(c) To expedite the completion of the entire **Project** even though the completion of this particular **Contract** may thereby be delayed.

ARTICLE 34. NO ESTOPPEL

34.1 Neither the **City** nor any **Agency**, official, agent or employee thereof, shall be bound, precluded or estopped by any determination, decision, approval, order, letter, payment or certificate made or given under or in connection with this **Contract** by the **City**, the **Commissioner**, the **Engineer**, the **Resident Engineer**, or any other official, agent or employee of the **City**, either before or after the final completion and acceptance of the **Work** and payment therefor:

34.1.1 From showing the true and correct classification, amount, quality or character of the **Work** actually done; or that any such determination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular, or that the **Work**, or any part thereof, does not in fact conform to the requirements of this **Contract**; and

34.1.2 From demanding and recovering from the **Contractor** any overpayment made to it, or such damages as the **City** may sustain by reason of the **Contractor's** failure to perform each and every part of its **Contract**.

CHAPTER VIII: LABOR PROVISIONS

ARTICLE 35. EMPLOYEES

35.1 The **Contractor** and its **Subcontractors** shall not employ on the **Work**:

35.1.1 Anyone who is not competent, faithful and skilled in the **Work** for which he/she shall be employed; and whenever the **Commissioner** shall inform the **Contractor**, in writing, that any employee is, in his/her opinion, incompetent, unfaithful or disobedient, that employee shall be discharged from the **Work** forthwith, and shall not again be employed upon it; or

35.1.2 Any labor, materials or means whose employment, or utilization during the course of this **Contract**, may tend to or in any way cause or result in strikes, work stoppages, delays, suspension of **Work** or similar troubles by workers employed by the **Contractor** or its **Subcontractors**, or by any of the trades working in or about the buildings and premises where **Work** is being performed under this **Contract**, or by **Other Contractors** or their **Subcontractors** pursuant to other contracts, or on any other building or premises owned or operated by the **City**, its **Agencies**, departments, boards or authorities. Any violation by the **Contractor** of this requirement may, upon certification of the **Commissioner**, be considered as proper and sufficient cause for declaring the **Contractor** to be in default, and for the **City** to take action against it as set forth in Chapter X of this **Contract**, or such other article of this **Contract** as the Commissioner may deem proper; or

35.1.3 In accordance with Section 220.3-e of the Labor Law of the State of New York (hereinafter “Labor Law”), the **Contractor** and its **Subcontractors** shall not employ on the **Work** any apprentice, unless he/she is a registered individual, under a bona fide program registered with the New York State Department of Labor. The allowable ratio of apprentices to journey-level workers in any craft classification shall not be greater than the ratio permitted to the **Contractor** as to its work force on any job under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the **Comptroller** of the **City** for the classification of **Work** actually performed. The **Contractor** or **Subcontractor** will be required to furnish written evidence of the registration of its program and apprentices as well as all the appropriate ratios and wage rates, for the area of the construction prior to using any apprentices on the **Contract Work**.

35.2 If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand (\$250,000) dollars, all laborers, workers, and mechanics employed in the performance of the **Contract** on the public work site, either by the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by the **Contract**, shall be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor’s Occupational Safety and Health Administration that is at least ten (10) hours in duration.

35.3 In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the Administrative Code, respectively,

35.3.1 The **Contractor** shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this **Contract** to (a) the Commissioner of the Department of Investigation, (b) a member of the New York City Council, the Public Advocate, or the **Comptroller**, or (c) the **CCPO**, **ACCO**, **Agency** head, or **Commissioner**.

35.3.2 If any of the **Contractor**’s officers or employees believes that he or she has been the subject of an adverse personnel action in violation of Article 35.3.1, he or she shall be entitled to bring a cause of action against the **Contractor** to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (a) an injunction to restrain continued retaliation, (b) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (c) reinstatement of full fringe benefits and seniority rights, (d) payment of two times back pay, plus interest, and (e) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney’s fees.

35.3.3 The **Contractor** shall post a notice provided by the **City** in a prominent and accessible place on any site where work pursuant to the **Contract** is performed that contains information about:

35.3.3(a) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the **Contract**; and

35.3.3(b) the rights and remedies afforded to its employees under Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the

reporting of allegations of fraud, false claims, criminality or corruption in connection with the **Contract**.

35.3.4 For the purposes of this Article 35.3, “adverse personnel action” includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.

35.3.5 This Article 35.3 is applicable to all of the **Contractor’s Subcontractors** having subcontracts with a value in excess of \$100,000; accordingly, the **Contractor** shall include this rider in all subcontracts with a value a value in excess of \$100,000.

35.4 Article 35.3 is not applicable to this **Contract** if it is valued at \$100,000 or less. Articles 35.3.1, 35.3.2, 35.3.4, and 35.3.5 are not applicable to this **Contract** if it was solicited pursuant to a finding of an emergency.

35.5 Paid Sick Leave Law.

35.5.1 Introduction and General Provisions.

35.5.1(a) The Earned Sick Time Act, also known as the Paid Sick Leave Law (“PSLL”), requires covered employees who annually perform more than 80 hours of work in New York City to be provided with paid sick time². Contractors of the **City** or of other governmental entities may be required to provide sick time pursuant to the PSLL.

35.5.1(b) The PSLL became effective on April 1, 2014, and is codified at Title 20, Chapter 8, of the New York City Administrative Code. It is administered by the City’s Department of Consumer Affairs (“DCA”); DCA’s rules promulgated under the PSLL are codified at Chapter 7 of Title 6 of the Rules of the City of New York (“Rules”).

35.5.1(c) The **Contractor** agrees to comply in all respects with the PSLL and the Rules, and as amended, if applicable, in the performance of this **Contract**. The **Contractor** further acknowledges that such compliance is a material term of this **Contract** and that failure to comply with the PSLL in performance of this **Contract** may result in its termination.

35.5.1(d) The **Contractor** must notify the **Agency Chief Contracting Officer** of the **Agency** with whom it is contracting in writing within ten (10) days of receipt of a complaint (whether oral or written) regarding the PSLL involving the performance of this **Contract**. Additionally, the **Contractor** must cooperate with DCA’s education efforts and must comply with DCA’s subpoenas and other document demands as set forth in the PSLL and Rules.

35.5.1(e) The PSLL is summarized below for the convenience of the **Contractor**. The **Contractor** is advised to review the PSLL and Rules in their entirety. On the

² Pursuant to the PSLL, if fewer than five employees work for the same employer, as determined pursuant to New York City Administrative Code § 20-912(g), such employer has the option of providing such employees uncompensated sick time.

website www.nyc.gov/PaidSickLeave there are links to the PSL and the associated Rules as well as additional resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the **Contractor** can get more information about how to comply with the PSL. The **Contractor** acknowledges that it is responsible for compliance with the PSL notwithstanding any inconsistent language contained herein.

35.5.2 Pursuant to the PSL and the Rules: Applicability, Accrual, and Use.

35.5.2(a) An employee who works within the City of New York for more than eighty hours in any consecutive 12-month period designated by the employer as its “calendar year” pursuant to the PSL (“Year”) must be provided sick time. Employers must provide a minimum of one hour of sick time for every 30 hours worked by an employee and compensation for such sick time must be provided at the greater of the employee’s regular hourly rate or the minimum wage. Employers are not required to provide more than 40 hours of sick time to an employee in any Year.

35.5.2(b) An employee has the right to determine how much sick time he or she will use, provided that employers may set a reasonable minimum increment for the use of sick time not to exceed four hours per **Day**. In addition, an employee may carry over up to 40 hours of unused sick time to the following Year, provided that no employer is required to allow the use of more than forty hours of sick time in a Year or carry over unused paid sick time if the employee is paid for such unused sick time and the employer provides the employee with at least the legally required amount of paid sick time for such employee for the immediately subsequent Year on the first **Day** of such Year.

35.5.2(c) An employee entitled to sick time pursuant to the PSL may use sick time for any of the following:

- i. such employee’s mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee’s need for medical diagnosis or preventive medical care;
- ii. such employee’s care of a family member (an employee’s child, spouse, domestic partner, parent, sibling, grandchild or grandparent, or the child or parent of an employee’s spouse or domestic partner) who has a mental illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;
- iii. closure of such employee’s place of business by order of a public official due to a public health emergency; or
- iv. such employee’s need to care for a child whose school or childcare provider has been closed due to a public health emergency.

35.5.2(d) An employer must not require an employee, as a condition of taking sick time, to search for a replacement. However, an employer may require an employee to provide: reasonable notice of the need to use sick time; reasonable documentation that the use of sick time was needed for a reason above if for an absence of more than three consecutive work days; and/or written confirmation that an employee used sick time pursuant to the PSL. However, an employer may not require documentation specifying the nature of a medical condition or otherwise require disclosure of the details of a medical condition as a condition of providing sick time and health information obtained solely due to an employee’s use of sick time pursuant to the PSL must be treated by the

employer as confidential.

35.5.2(e) If an employer chooses to impose any permissible discretionary requirement as a condition of using sick time, it must provide to all employees a written policy containing those requirements, using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny sick time to an employee because of non-compliance with such a policy.

35.5.2(f) Sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the sick time was used.

35.5.3 Exemptions and Exceptions. Notwithstanding the above, the PSLL does not apply to any of the following:

35.5.3(a) an independent contractor who does not meet the definition of employee under section 190(2) of the New York State Labor Law;

35.5.3(b) an employee covered by a valid collective bargaining agreement in effect on April 1, 2014, until the termination of such agreement;

35.5.3(c) an employee in the construction or grocery industry covered by a valid collective bargaining agreement if the provisions of the PSLL are expressly waived in such collective bargaining agreement;

35.5.3(d) an employee covered by another valid collective bargaining agreement if such provisions are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the PSLL for such employee;

35.5.3(e) an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines his or her own schedule, has the ability to reject or accept any assignment referred to him or her, and is paid an average hourly wage that is at least four times the federal minimum wage;

35.5.3(f) an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;

35.5.3(g) an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or

35.5.3(h) a participant in a Work Experience Program (WEP) under section 336-c of the New York State Social Services Law.

35.5.4 Retaliation Prohibited. An employer may not threaten or engage in retaliation against an employee for exercising or attempting in good faith to exercise any right provided by the PSLL. In addition, an employer may not interfere with any investigation, proceeding, or hearing pursuant to the PSLL.

35.5.5 Notice of Rights.

35.5.5(a) An employer must provide its employees with written notice of their rights pursuant to the PSLL. Such notice must be in English and the primary language spoken

by an employee, provided that DCA has made available a translation into such language. Downloadable notices are available on DCA's website at <http://www.nyc.gov/html/dca/html/law/PaidSickLeave.shtml>.

35.5.5(b) Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed fifty dollars for each employee who was not given appropriate notice.

35.5.6 Records. An employer must retain records documenting its compliance with the PSLL for a period of at least three years, and must allow DCA to access such records in furtherance of an investigation related to an alleged violation of the PSLL.

35.5.7 Enforcement and Penalties.

35.5.7(a) Upon receiving a complaint alleging a violation of the PSLL, DCA has the right to investigate such complaint and attempt to resolve it through mediation. Within **30 Days** of written notification of a complaint by DCA, or sooner in certain circumstances, the employer must provide DCA with a written response and such other information as DCA may request. If DCA believes that a violation of the PSLL has occurred, it has the right to issue a notice of violation to the employer.

35.5.7(b) DCA has the power to grant an employee or former employee all appropriate relief as set forth in New York City Administrative Code § 20-924(d). Such relief may include, among other remedies, treble damages for the wages that should have been paid, damages for unlawful retaliation, and damages and reinstatement for unlawful discharge. In addition, DCA may impose on an employer found to have violated the PSLL civil penalties not to exceed \$500 for a first violation, \$750 for a second violation within two years of the first violation, and \$1,000 for each succeeding violation within two years of the previous violation.

35.5.8 More Generous Policies and Other Legal Requirements. Nothing in the PSLL is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous sick time policy, or the obligation of an employer to comply with any contract, collective bargaining agreement, employment benefit plan or other agreement providing more generous sick time. The PSLL provides minimum requirements pertaining to sick time and does not preempt, limit or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of sick leave or time, whether paid or unpaid, or that extends other protections to employees. The PSLL may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule or regulation.

35.6 HireNYC: Hiring and Reporting Requirements. This Article 35.6 applies to construction contracts of \$1,000,000 or more. The **Contractor** shall comply with the requirements of Articles 35.6.1-35.6.5 for all non-trades jobs (e.g., for an administrative position arising out of **Work** ant located in New York City). The **Contractor** shall reasonably cooperate with SBS and the **City** on specific outreach events, including "Hire-on-the-Spot" events, for the hiring of trades workers in connection with the **Work**. If provided elsewhere in this **Contract**, this **Contract** is subject to a project labor agreement.

35.6.1 Enrollment. The **Contractor** shall enroll with the HireNYC system, found at www.nyc.gov/sbs, within thirty (30) days after the registration of this **Contract** pursuant to Section 328 of the New York City Charter. The **Contractor** shall provide information about the business, designate a primary contact and say whether it intends to hire for any entry

to mid-level job opportunities arising from this **Contract** and located in New York City, and, if so, the approximate start date of the first hire.

35.6.2 Job Posting Requirements.

35.6.2(a) Once enrolled in HireNYC, the **Contractor** agrees to update the HireNYC portal with all entry to mid-level job opportunities arising from this **Contract** and located in New York City, if any, which shall be defined as jobs requiring no more than an associate degree, as provided by the New York State Department of Labor (see Column F of <https://labor.ny.gov/stats/2012-2022-NYS-Employment-Prospects.xls>). The information to be updated includes the types of entry and mid-level positions made available from the work arising from the **Contract** and located in New York City, the number of positions, the anticipated schedule of initiating the hiring process for these positions, and the contact information for the **Contractor's** representative charged with overseeing hiring. The **Contractor** must update the HireNYC portal with any hiring needs arising from the contract and located in New York City, and the requirements of the jobs to be filled, no less than three weeks prior to the intended first day of employment for each new position, except with the permission of SBS, not to be unreasonably withheld, and must also update the HireNYC portal as set forth below.

35.6.2(b) After enrollment through HireNYC and submission of relevant information, SBS will work with the **Contractor** to develop a recruitment plan which will outline the candidate screening process, and will provide clear instructions as to when, where, and how interviews will take place. HireNYC will screen applicants based on employer requirements and refer applicants whom it believes are qualified to the **Contractor** for interviews. The **Contractor** must interview referred applicants whom it believes are qualified.

35.6.2(c) After completing an interview of a candidate referred by HireNYC, the **Contractor** must provide feedback via the portal within twenty (20) business days to indicate which candidates were interviewed and hired, if any. In addition, the **Contractor** shall provide the start date of new hires, and additional information reasonably related to such hires, within twenty (20) business days after the start date. In the event the **Contractor** does not have any job openings covered by this Rider in any given year, the **Contractor** shall be required to provide an annual update to HireNYC to that effect. For this purpose, the reporting year shall run from the date of the registration of the **Contract** pursuant to Charter section 328 and each anniversary date.

35.6.2(d) These requirements do not limit the **Contractor's** ability to assess the qualifications of prospective workers, and to make final hiring and retention decisions. No provision of this Article 35.6 shall be interpreted so as to require the **Contractor** to employ any particular worker.

35.6.2(e) In addition, the provisions of this Article 35.6 shall not apply to positions that the **Contractor** intends to fill with employees employed pursuant to the job retention provision of Section 22-505 of the Administrative Code of the City of New York. The **Contractor** shall not be required to report such openings with HireNYC. However, the **Contractor** shall enroll with the HireNYC system pursuant to Article 35.6.1, above, and, if such positions subsequently become open, then the remaining provisions of this Article 35.6 will apply.

35.6.3 Breach and Liquidated Damages. If the **Contractor** fails to comply with the terms of the **Contract** and this Article 35.6 (1) by not enrolling its business with HireNYC; (2) by not informing HireNYC, as required, of open positions; or (3) by failing to interview a qualified candidate, the **Agency** may assess liquidated damages in the amount of two-thousand five hundred dollars (\$2,500) per breach. For all other events of noncompliance with the terms of this Article 35.6, the **Agency** may assess liquidated damages in the amount of five hundred dollars (\$500) per breach. Furthermore, in the event the **Contractor** breaches the requirements of this Article 35.6 during the term of the **Contract**, the **City** may hold the **Contractor** in default of this **Contract**.

35.6.4 Audit Compliance. In addition to the auditing requirements set forth in other parts of the **Contract**, the **Contractor** shall permit SBS and the **City** to inspect any and all records concerning or relating to job openings or the hiring of individuals for work arising from the **Contract** and located in New York City. The **Contractor** shall permit an inspection within seven (7) business days of the request.

35.6.5 Other Reporting Requirements. The **Contractor** shall report to the **City**, on a monthly basis, all information reasonably requested by the **City** that is necessary for the **City** to comply with any reporting requirements imposed by **Law**, including any requirement that the **City** maintain a publicly accessible database. In addition, the **Contractor** agrees to comply with all reporting requirements imposed by **Law**, or as otherwise requested by the **City**.

35.6.6 Federal Hiring Requirements. If this **Contract** is federally funded (as indicated elsewhere in this **Contract**), the **Contractor** shall comply with all federal hiring requirements as may be set forth in this **Contract**, including, as applicable: (a) Section 3 of the HUD Act of 1968, which requires, to the greatest extent feasible, economic opportunities for 30 percent of new hires be given to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing and Executive Order 11246, which prohibits discrimination in employment due to race, color, religion, sex or national origin, and requires the implementation of goals for minority and female participation for work involving any construction trade.

ARTICLE 36. NO DISCRIMINATION

36.1 The **Contractor** specifically agrees, as required by Labor Law Section 220-e, as amended, that:

36.1.1 In the hiring of employees for the performance of **Work** under this **Contract** or any subcontract hereunder, neither the **Contractor**, **Subcontractor**, nor any person acting on behalf of such **Contractor** or **Subcontractor**, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the **Work** to which the employment relates;

36.1.2 Neither the **Contractor**, **Subcontractor**, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of **Work** under this **Contract** on account of race, creed, color or national origin;

36.1.3 There may be deducted from the amount payable to the **Contractor** by the **City** under this **Contract** a penalty of fifty (\$50.00) dollars for each person for each **Day** during which such person was discriminated against or intimidated in violation of the provisions of this

Contract; and

36.1.4 This **Contract** may be cancelled or terminated by the **City** and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this Article 36.

36.1.5 This Article 36 covers all construction, alteration and repair of any public building or public work occurring in the State of New York and the manufacture, sale, and distribution of materials, equipment, and supplies to the extent that such operations are performed within the State of New York pursuant to this **Contract**.

36.2 The **Contractor** specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:

36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.

36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this Article 36.2 shall, upon conviction thereof, be punished by a fine of not more than one hundred (\$100.00) dollars or by imprisonment for not more than thirty (30) **Days**, or both.

36.3 This **Contract** is subject to the requirements of Executive Order No. 50 (1980) (“E.O. 50”), as revised, and the rules and regulations promulgated thereunder. No contract will be awarded unless and until these requirements have been complied with in their entirety. By signing this **Contract**, the **Contractor** agrees that it:

36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and

36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner’s race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and

36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status,

disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and

36.3.4 Will send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the rules and regulations promulgated thereunder; and

36.3.5 Will furnish, before the award of the **Contract**, all information and reports, including an employment report, that are required by E.O. 50, the rules and regulations promulgated thereunder, and orders of the **City** Department of Business Services, Division of Labor Services (**DLS**) and will permit access to its books, records, and accounts by the **DLS** for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.

36.4 The **Contractor** understands that in the event of its noncompliance with the nondiscrimination clauses of this **Contract** or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this **Contract** and noncompliance with E.O. 50 and the rules and regulations promulgated thereunder. After a hearing held pursuant to the rules of the **DLS**, the Director of the **DLS** may direct the **Commissioner** to impose any or all of the following sanctions:

36.4.1 Disapproval of the **Contractor**; and/or

36.4.2 Suspension or termination of the **Contract**; and/or

36.4.3 Declaring the **Contractor** in default; and/or

36.4.4 In lieu of any of the foregoing sanctions, the Director of the **DLS** may impose an employment program.

In addition to any actions taken under this **Contract**, failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in a **City Agency** declaring the **Contractor** to be non-responsible in future procurements. The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

36.5 The **Contractor** specifically agrees, as required by Section 6-123 of the Administrative Code, that:

36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title 8 of the Administrative Code; and

36.5.2 Any failure to comply with this Article 36.5 may subject the **Contractor** to the remedies set forth in Section 6-123 of the Administrative Code, including, where appropriate, sanctions such as withholding of payment, imposition of an employment program, finding the **Contractor** to be in default, cancellation of the **Contract**, or any other sanction or remedy provided by **Law** or **Contract**.

ARTICLE 37. LABOR LAW REQUIREMENTS

37.1 The **Contractor** shall strictly comply with all applicable provisions of the Labor Law, as

amended. Such compliance is a material term of this **Contract**.

37.2 The **Contractor** specifically agrees, as required by Labor Law Sections 220 and 220-d, as amended, that:

37.2.1 Hours of **Work**: No laborer, worker, or mechanic in the employ of the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by this **Contract** shall be permitted or required to work more than eight (8) hours in any one (1) **Day**, or more than five (5) **Days** in any one (1) week, except as provided in the Labor Law and in cases of extraordinary emergency including fire, flood, or danger to life or property, or in the case of national emergency when so proclaimed by the President of the United States of America.

37.2.2 In situations in which there are not sufficient laborers, workers, and mechanics who may be employed to carry on expeditiously the **Work** contemplated by this **Contract** as a result of such restrictions upon the number of hours and **Days** of labor, and the immediate commencement or prosecution or completion without undue delay of the **Work** is necessary for the preservation of the **Site** and/or for the protection of the life and limb of the persons using the same, such laborers, workers, and mechanics shall be permitted or required to work more than eight (8) hours in any one (1) **Day**; or five (5) **Days** in any one (1) week; provided, however, that upon application of any **Contractor**, the **Commissioner** shall have first certified to the Commissioner of Labor of the State of New York (hereinafter "Commissioner of Labor") that such public **Work** is of an important nature and that a delay in carrying it to completion would result in serious disadvantage to the public; and provided, further, that such Commissioner of Labor shall have determined that such an emergency does in fact exist as provided in Labor Law Section 220.2.

37.2.3 Failure of the **Commissioner** to make such a certification to the Commissioner of Labor shall not entitle the **Contractor** to damages for delay or for any cause whatsoever.

37.2.4 Prevailing Rate of Wages: The wages to be paid for a legal day's **Work** to laborers, workers, or mechanics employed upon the **Work** contemplated by this **Contract** or upon any materials to be used thereon shall not be less than the "prevailing rate of wage" as defined in Labor Law Section 220, and as fixed by the **Comptroller** in the attached Schedule of Wage Rates and in updated schedules thereof. The prevailing wage rates and supplemental benefits to be paid are those in effect at the time the **Work** is being performed.

37.2.5 Requests for interpretation or correction in the Information for Bidders includes all requests for clarification of the classification of trades to be employed in the performance of the **Work** under this **Contract**. In the event that a trade not listed in the **Contract** is in fact employed during the performance of this **Contract**, the **Contractor** shall be required to obtain from the **Agency** the prevailing wage rates and supplementary benefits for the trades used and to complete the performance of this **Contract** at the price at which the **Contract** was awarded.

37.2.6 Minimum Wages: Except for employees whose wage is required to be fixed pursuant to Labor Law Section 220, all persons employed by the **Contractor** and any **Subcontractor** in the manufacture or furnishing of the supplies, materials, or equipment, or the furnishing of work, labor, or services, used in the performance of this **Contract**, shall be paid, without subsequent deduction or rebate unless expressly authorized by **Law**, not less than the sum mandated by **Law**.

37.3 Working Conditions: No part of the **Work**, labor or services shall be performed or rendered by

the **Contractor** in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of this **Contract**. Compliance with the safety, sanitary, and factory inspection **Laws** of the state in which the **Work** is to be performed shall be prima facie evidence of compliance with this Article 37.3.

37.4 Prevailing Wage Enforcement: The **Contractor** agrees to pay for all costs incurred by the **City** in enforcing prevailing wage requirements, including the cost of any investigation conducted by or on behalf of the **Agency** or the **Comptroller**, where the **City** discovers a failure to comply with any of the requirements of this Article 37 by the **Contractor** or its **Subcontractor(s)**. The **Contractor** also agrees that, should it fail or refuse to pay for any such investigation, the **Agency** is hereby authorized to deduct from a **Contractor's** account an amount equal to the cost of such investigation.

37.4.1 The Labor Law Section 220 and Section 220-d, as amended, provide that this **Contract** shall be forfeited and no sum paid for any **Work** done hereunder on a second conviction for willfully paying less than:

37.4.1(a) The stipulated prevailing wage scale as provided in Labor Law section 220, as amended, or

37.4.1(b) The stipulated minimum hourly wage scale as provided in Labor Law section 220-d, as amended.

37.4.2 For any breach or violation of either working conditions (Article 37.3) or minimum wages (Article 37.2.6) provisions, the party responsible therefor shall be liable to the **City** for liquidated damages, which may be withheld from any amounts due on any contracts with the **City** of such party responsible, or may be recovered in actions brought by the **City** Corporation Counsel in the name of the **City**, in addition to damages for any other breach of this **Contract**, for a sum equal to the amount of any underpayment of wages due to any employee engaged in the performance of this **Contract**. In addition, the **Commissioner** shall have the right to cancel contracts and enter into other contracts for the completion of the original contract, with or without public letting, and the original **Contractor** shall be liable for any additional cost. All sums withheld or recovered as deductions, rebates, refunds, or underpayment of wages hereunder, shall be held in a special deposit account and shall be paid without interest, on order of the **Comptroller**, directly to the employees who have been paid less than minimum rates of pay as set forth herein and on whose account such sums were withheld or recovered, provided that no claims by employees for such payments shall be entertained unless made within two (2) years from the date of actual notice to the **Contractor** of the withholding or recovery of such sums by the **City**.

37.4.3 A determination by the **Comptroller** that a **Contractor** and/or its **Subcontractor** willfully violated Labor Law Section 220 will be forwarded to the **City's** five District Attorneys for review.

37.4.4 The **Contractor's** or **Subcontractor's** noncompliance with this Article 37.4 and Labor Law Section 220 may result in an unsatisfactory performance evaluation and the **Comptroller** may also find and determine that the **Contractor** or **Subcontractor** willfully violated the New York Labor **Law**.

37.4.4(a) An unsatisfactory performance evaluation for noncompliance with this Article 37.4 may result in a determination that the **Contractor** is a non-responsible bidder on subsequent procurements with the **City** and thus a rejection of a future award

of a contract with the **City**, as well as any other sanctions provided for by **Law**.

37.4.4(b) Labor Law Section 220-b, as amended, provides that when two (2) final determinations have been rendered against a **Contractor** or **Subcontractor** within any consecutive six (6) year period determining that such **Contractor** or **Subcontractor** has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with the Labor Law and this Article 37.4, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public works projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the second final determination. If the final determination involves the falsification of payroll records or the kickback of wages or supplements, the **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the first final determination.

37.4.4(c) Labor Law Section 220, as amended, provides that the **Contractor** or **Subcontractor** found to have violated this Article 37.4 may be directed to make payment of wages or supplements including interest found to be due, and the **Contractor** or **Subcontractor** may be directed to make payment of a further sum as a civil penalty in an amount not exceeding twenty-five (25%) percent of the total amount found to be due.

37.5 The **Contractor** and its **Subcontractors** shall within ten (10) **Days** after mailing of a Notice of Award or written order, post in prominent and conspicuous places in each and every plant, factory, building, and structure where employees of the **Contractor** and its **Subcontractors** engaged in the performance of this **Contract** are employed, notices furnished by the **City**, in relation to prevailing wages and supplements, minimum wages, and other stipulations contained in Sections 220 and 220-h of the Labor Law, and the **Contractor** and its **Subcontractors** shall continue to keep such notices posted in such prominent and conspicuous places until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services required to be furnished or rendered under this **Contract**.

37.6 The **Contractor** shall strictly comply with all of the provisions of Articles 37.6.1 through 37.6.5, and provide for all workers, laborers or mechanics in its employ, the following:

37.6.1 Notices Posted At **Site**: Post, in a location designated by the **City**, schedules of prevailing wages and supplements for this **Project**, a copy of all re-determinations of such schedules for the **Project**, the Workers' Compensation **Law** Section 51 notice, all other notices required by **Law** to be posted at the **Site**, the **City** notice that this **Project** is a public works project on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the **City** directs the **Contractor** to post. The **Contractor** shall provide a surface for such notices which is satisfactory to the **City**. The **Contractor** shall maintain and keep current such notices in a legible manner and shall replace any notice or schedule which is damaged, defaced, illegible or removed for any reason. The **Contractor** shall post such notices before commencing any **Work** on the **Site** and shall maintain such notices until all **Work** on the **Site** is complete; and

37.6.2 Daily **Site** Sign-in Sheets: Maintain daily **Site** sign-in sheets, and require that **Subcontractors** maintain daily **Site** sign-in sheets for its employees, which include blank spaces for an employee's name to be both printed and signed, job title, date started and Social Security number, the time the employee began work and the time the employee left

work, until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services to be furnished or rendered under this **Contract** unless exception is granted by the **Comptroller** upon application by the **Agency**. In the alternative, subject to the approval of the **CCPO**, the **Contractor** and **Subcontractor** may maintain an electronic or biometric sign-in system, which provides the information required by this Article 37.6.2; and

37.6.3 Individual Employee Information Notices: Distribute a notice to each worker, laborer or mechanic employed under this **Contract**, in a form provided by the **Agency**, that this **Project** is a public works project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand (\$250,000) dollars, such notice shall also include a statement that each worker, laborer or mechanic must be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration. Such notice shall be distributed to each worker before he or she starts performing any **Work** of this **Contract** and with the first paycheck after July first of each year. "Worker, laborer or mechanic" includes employees of the **Contractor** and all **Subcontractors** and all employees of suppliers entering the **Site**. At the time of distribution, the **Contractor** shall have each worker, laborer or mechanic sign a statement, in a form provided by the **Agency**, certifying that the worker has received the notice required by this Article 37.6.3, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3(a) The **Contractor** and each **Subcontractor** shall notify each worker, laborer or mechanic employed under this **Contract** in writing of the prevailing rate of wages for their particular job classification. Such notification shall be given to every worker, laborer, and mechanic on their first pay stub and with every pay stub thereafter; and

37.6.4 **Site Laminated Identification Badges**: The **Contractor** shall provide laminated identification badges which include a photograph of the worker's, laborer's or mechanic's face and indicate the worker's, laborer's or mechanic's name, trade, employer's name, and employment starting date (month/day/year). Further, the **Contractor** shall require as a condition of employment on the **Site**, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the **City**. The **Commissioner** may grant a written waiver from the requirement that the laminated identification badge include a photograph if the **Contractor** demonstrates that the identity of an individual wearing a laminated identification badge can be easily verified by another method; and

37.6.5 **Language Other Than English Used On Site**: Provide the **ACCO** notice when three (3) or more employees (worker and/or laborer and/or mechanic) on the **Site**, at any time, speak a language other than English. The **ACCO** will then provide the **Contractor** the notices described in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under this Article 37; and

37.6.6 **Provision of Records**: The **Contractor** and **Subcontractor(s)** shall produce within five (5) **Days** on the **Site** of the **Work** and upon a written order of the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, or the **Comptroller**, such records as are required to be kept by this Article 37.6; and

37.6.7 The **Contractor** and **Subcontractor(s)** shall pay employees by check or direct deposit. If this **Contract** is for an amount greater than one million (\$1,000,000) dollars, checks issued by the **Contractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**). For any subcontract for an amount greater than seven hundred fifty thousand (\$750,000) dollars, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and

37.6.8 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

37.7 The **Contractor** and its **Subcontractors** shall keep such employment and payroll records as are required by Section 220 of the Labor Law. The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of this Article 37.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

37.8 At the time the **Contractor** makes application for each partial payment and for final payment, the **Contractor** shall submit to the **Commissioner** a written payroll certification, in the form provided by this **Contract**, of compliance with the prevailing wage, minimum wage, and other provisions and stipulations required by Labor Law Section 220 and of compliance with the training requirements of Labor Law Section 220-h set forth in Article 35.2. This certification of compliance shall be a condition precedent to payment and no payment shall be made to the **Contractor** unless and until each such certification shall have been submitted to and received by the **Commissioner**.

37.9 This **Contract** is executed by the **Contractor** with the express warranty and representation that the **Contractor** is not disqualified under the provisions of Section 220 of the Labor Law from the award of the **Contract**.

37.10 Any breach or violation of any of the foregoing shall be deemed a breach or violation of a material provision of this **Contract**, and grounds for cancellation thereof by the **City**.

ARTICLE 38. PAYROLL REPORTS

38.1 The **Contractor** and its **Subcontractor(s)** shall maintain on the **Site** during the performance of the **Work** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain and shall submit such original payrolls or transcripts, subscribed and affirmed by it as true, within thirty (30) **Days** after issuance of its first payroll, and every thirty (30) **Days** thereafter, pursuant to Labor Law Section 220(3-a)(a)(iii). The **Contractor** and **Subcontractor(s)** shall submit such original payrolls or transcripts along with each and every payment requisition. If payment requisitions are not submitted at least once a month, the **Contractor** and its **Subcontractor(s)** shall submit original payrolls and transcripts both along with its payment requisitions and independently of its payment requisitions.

38.2 The **Contractor** shall maintain payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**. If such payrolls and transcripts are maintained outside of New York City after the completion of the **Work** and their production is required pursuant to this Article 38, the **Contractor** shall produce such records in New York City upon request by the **City**.

38.3 The **Contractor** and **Subcontractor(s)** shall comply with any written order, direction, or request made by the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law**

Investigator(s), or the **Comptroller**, to provide to the requesting party any of the following information and/or records within five (5) **Days** of such written order, direction, or request:

38.3.1 Such original payrolls or transcripts thereof subscribed and affirmed by it as true and the statements signed by each worker pursuant to this Chapter VIII; and/or

38.3.2 Attendance sheets for each **Day** on which any employee of the **Contractor** and/or any of the **Subcontractor(s)** performed **Work** on the **Site**, which attendance sheet shall be in a form acceptable to the **Agency** and shall provide information acceptable to the **Agency** to identify each such employee; and/or

38.3.3 Any other information to satisfy the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law Investigator(s)** or the **Comptroller**, that this Chapter VIII and the Labor Law, as to the hours of employment and prevailing rates of wages and/or supplemental benefits, are being observed.

38.4 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 38.1 and/or 38.2 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

ARTICLE 39. DUST HAZARDS

39.1 Should a harmful dust hazard be created in performing the **Work** of this **Contract**, for the elimination of which appliances or methods have been approved by the Board of Standards and Appeals of the City of New York, such appliances and methods shall be installed, maintained, and effectively operated during the continuance of such harmful dust hazard. Failure to comply with this provision after notice shall make this **Contract** voidable at the sole discretion of the **City**.

CHAPTER IX: PARTIAL AND FINAL PAYMENTS

ARTICLE 40. CONTRACT PRICE

40.1 The **City** shall pay, and the **Contractor** agrees to accept, in full consideration for the **Contractor's** performance of the **Work** subject to the terms and conditions hereof, the lump sum price or unit prices for which this **Contract** was awarded, plus the amount required to be paid for any **Extra Work** ordered by the **Commissioner** under Article 25, less credit for any **Work** omitted pursuant to Article 29.

ARTICLE 41. BID BREAKDOWN ON LUMP SUM

41.1 Within fifteen (15) **Days** after the commencement date specified in the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Resident Engineer**, the **Contractor** shall submit to the **Resident Engineer** a breakdown of its bid price, or of lump sums bid for items of the **Contract**, showing the various operations to be performed under the **Contract**, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the **Resident Engineer**.

41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.

41.3 The **Contractor** shall also submit such other information relating to the bid breakdown as directed by the **Resident Engineer**. Thereafter, the breakdown may be used only for checking the **Contractor's** applications for partial payments hereunder, but shall not be binding upon the **City**, the **Commissioner**, or the **Engineer** for any purpose whatsoever.

ARTICLE 42. PARTIAL PAYMENTS

42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once each calendar month (except where the **Commissioner** approves in writing the submission of invoices on a more frequent basis and for invoices relating to **Work** performed pursuant to a change order), the **Contractor** may submit to the **Engineer** a requisition for a partial payment in the prescribed form, which shall contain an estimate of the quantity and the fair value of the **Work** done during the payment period.

42.2 Partial payments may be made for materials, fixtures, and equipment in advance of their actual incorporation in the **Work**, as the **Commissioner** may approve, and upon the terms and conditions set forth in the General Conditions.

42.3 The **Contractor** shall also submit to the **Commissioner** in connection with every application for partial payment a verified statement in the form prescribed by the **Comptroller** setting forth the information required under Labor Law Section 220-a.

42.4 Within thirty (30) **Days** after receipt of a satisfactory payment application, and within sixty (60) **Days** after receipt of a satisfactory payment application in relation to **Work** performed pursuant to a change order, the **Engineer** will prepare and certify, and the **Commissioner** will approve, a voucher for a partial payment in the amount of such approved estimate, less any and all deductions authorized to be made by the **Commissioner** under the terms of this **Contract** or by **Law**.

ARTICLE 43. PROMPT PAYMENT

43.1 The Prompt Payment provisions of the **PPB** Rules in effect at the time of the bid will be applicable to payments made under this **Contract**. The provisions require the payment to the **Contractor** of interest on payments made after the required payment date, except as set forth in the **PPB** Rules.

43.2 The **Contractor** shall submit a proper invoice to receive payment, except where the **Contract** provides that the **Contractor** will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.

43.3 Determination of interest due will be made in accordance with the **PPB** Rules.

43.4 If the **Contractor** is paid interest, the proportionate share(s) of that interest shall be forwarded by the **Contractor** to its **Subcontractor(s)**.

43.5 The **Contractor** shall pay each **Subcontractor** or **Materialman** not later than seven (7) **Days** after receipt of payment out of amounts paid to the **Contractor** by the **City** for **Work** performed by the **Subcontractor** or **Materialman** under this **Contract**.

43.5.1 If **Contractor** fails to make any payment to any **Subcontractor** or **Materialman** within seven (7) **Days** after receipt of payment by the **City** pursuant to this Article 43.5,

then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at the rate of interest in effect on the date such payment is made by the **Contractor** computed in accordance with Section 756-b (1)(b) of the New York General Business Law. Accrual of interest shall commence on the **Day** immediately following the expiration of the seventh **Day** following receipt of payment by the **Contractor** from the **City** and shall end on the date on which payment is made.

43.6 The **Contractor** shall include in each of its subcontracts a provision requiring each **Subcontractor** to make payment to each of its **Subcontractors** or **Materialmen** for **Work** performed under this **Contract** in the same manner and within the same time period set forth above.

ARTICLE 44. SUBSTANTIAL COMPLETION PAYMENT

44.1 The **Contractor** shall submit with the **Substantial Completion** requisition:

44.1.1 A final verified statement of any pending Article 27 disputes in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay.

44.1.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City** Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 44.1.1(a) is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor** upon acceptance of the **Substantial Completion** payment pursuant to this Article 44, will have waived any such claims.

44.1.2 A **Final Approved Punch List**.

44.1.3 Where required, a request for an extension of time to achieve **Substantial Completion** or final extension of time.

44.2 The **Commissioner** shall issue a voucher calling for payment of any part or all of the balance due for **Work** performed under the **Contract**, including monies retained under Article 21, less any and all deductions authorized to be made by the **Commissioner**, under this **Contract** or by **Law**, and less twice the amount the **Commissioner** considers necessary to ensure the completion of the balance of the **Work** by the **Contractor**. Such a payment shall be considered a partial and not a final payment. No **Substantial Completion** payment shall be made under this Article 44 where the **Contractor** failed to complete the **Work** within the time fixed for such completion in the Schedule A of the General Conditions, or within the time to which completion may have been extended, until an extension or extensions of time for the completion of **Work** have been acted upon pursuant to Article 13.

44.3 No further partial payments shall be made to the **Contractor** after **Substantial Completion**, except the **Substantial Completion** payment and payment pursuant to any **Contractor's** requisition that were properly filed with the **Commissioner** prior to the date of **Substantial Completion**; however, the **Commissioner** may grant a waiver for further partial payments after the date of **Substantial Completion** to permit payments for change order **Work** and/or release of retainage and deposits pursuant to Articles 21 and 24. Such waiver shall be in writing.

44.4 The **Contractor** acknowledges that nothing contained in this Article 44 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 45. FINAL PAYMENT

45.1 After completion and **Final Acceptance** of the **Work**, the **Contractor** shall submit all required certificates and documents, together with a requisition for the balance claimed to be due under the **Contract**, less the amount authorized to be retained for maintenance under Article 24. Such submission shall be within 90 days of the date of the **Commissioner's** written determination of **Final Acceptance**, or within such additional time as may be granted by the **Commissioner** in writing. If the **Contractor** fails to submit all required certificates and documents within the time allowed, no payment of the balance claimed shall be made to the **Contractor** and the **Contractor** shall be deemed to have forfeited its right to payment of any balance claimed. A verified statement similar to that required in connection with applications for partial payments shall also be submitted to the **Commissioner**.

45.2 Amended Verified Statement of Claims: The **Contractor** shall also submit with the final requisition any amendments to the final verified statement of any pending dispute resolution procedures in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) that have occurred subsequent to **Substantial Completion**, setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each such item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay. With reference to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City** Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 45.2, is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor**, upon acceptance of the Final Payment pursuant to Article 46, will have waived any such claims.

45.3 Preparation of Final Voucher: Upon determining the balance due hereunder other than on account of claims, the **Engineer** will prepare and certify, for the **Commissioner's** approval, a voucher for final payment in that amount less any and all deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**. In the case of a lump sum **Contract**, the **Commissioner** shall certify the voucher for final payment within thirty (30) **Days** from the date of completion and acceptance of the **Work**, provided all requests for extensions of time have been acted upon.

45.3.1 All prior certificates and vouchers upon which partial payments were made, being merely estimates made to enable the **Contractor** to prosecute the **Work** more advantageously, shall be subject to correction in the final voucher, and the certification of the **Engineer**

thereon and the approval of the **Commissioner** thereof, shall be conditions precedent to the right of the **Contractor** to receive any money hereunder. Such final voucher shall be binding and conclusive upon the **Contractor**.

45.3.2 Payment pursuant to such final voucher, less any deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**, shall constitute the final payment, and shall be made by the **Comptroller** within thirty (30) **Days** after the filing of such voucher in his/her office.

45.4 The **Contractor** acknowledges that nothing contained in this Article 45 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 46. ACCEPTANCE OF FINAL PAYMENT

46.1 The acceptance by the **Contractor**, or by anyone claiming by or through it, of the final payment, whether such payment be made pursuant to any judgment of any court, or otherwise, shall constitute and operate as a release of the **City** from any and all claims of and liability to the **Contractor** for anything heretofore done or furnished for the **Contractor** relating to or arising out of this **Contract** and the **Work** done hereunder, and for any prior act, neglect or default on the part of the **City** or any of its officials, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

46.2 The **Contractor** is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this Article 46, or those for amounts deducted by the **Commissioner** from the final requisition or from the final payment as certified by the **Engineer** and approved by the **Commissioner**, shall not be effective to reserve such claims, anything stated to the **Contractor** orally or in writing by any official, agent or employee of the **City** to the contrary notwithstanding.

46.3 Should the **Contractor** refuse to accept the final payment as tendered by the **Comptroller**, it shall constitute a waiver of any right to interest thereon.

46.4 The **Contractor**, however, shall not be barred by this Article 46 from commencing an action for breach of **Contract** to the extent permitted by **Law** and by the terms of the **Contract** for any claims that are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45 or that arose after submission of the final payment requisition, provided that a detailed and verified statement of claim is served upon the contracting **Agency** and **Comptroller** not later than forty (40) **Days** after the making of such final payment by electronic funds transfer (EFT) or the mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs, and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant

to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the **City Charter**, as amended.

CHAPTER X: CONTRACTOR'S DEFAULT

ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT

48.1 In addition to those instances specifically referred to in other Articles herein, the **Commissioner** shall have the right to declare the **Contractor** in default of this **Contract** if:

48.1.1 The **Contractor** fails to commence **Work** when notified to do so by the **Commissioner**; or if

48.1.2 The **Contractor** shall abandon the **Work**; or if

48.1.3 The **Contractor** shall refuse to proceed with the **Work** when and as directed by the **Commissioner**; or if

48.1.4 The **Contractor** shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the **Commissioner**, to complete the **Work** in accordance with the progress schedule; or if

48.1.5 The **Contractor** shall fail or refuse to increase sufficiently such working force when ordered to do so by the **Commissioner**; or if

48.1.6 The **Contractor** shall sublet, assign, transfer, convert or otherwise dispose of this **Contract** other than as herein specified; or sell or assign a majority interest in the **Contractor**; or if

48.1.7 The **Contractor** fails to secure and maintain all required insurance; or if

48.1.8 A receiver or receivers are appointed to take charge of the **Contractor's** property or affairs; or if

48.1.9 The **Commissioner** shall be of the opinion that the **Contractor** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the **Work**, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if

48.1.10 The **Commissioner** shall be of the opinion that the **Contractor** is or has been willfully or in bad faith violating any of the provisions of this **Contract**; or if

48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the

Commissioner's opinion, attributable to conditions within the **Contractor's** control; or if

48.1.12 The **Work** is not completed within the time herein provided therefor or within the time to which the **Contractor** may be entitled to have such completion extended; or if

48.1.13 Any statement or representation of the **Contractor** in the **Contract** or in any document submitted by the **Contractor** with respect to the **Work**, the **Project**, or the **Contract** (or for purposes of securing the **Contract**) was untrue or incorrect when made; or if

48.1.14 The **Contractor** or any of its officers, directors, partners, five (5%) percent shareholders, principals, or other persons substantially involved in its activities, commits any of the acts or omissions specified as the grounds for debarment in the **PPB** Rules.

48.2 Before the **Commissioner** shall exercise his/her right to declare the **Contractor** in default, the **Commissioner** shall give the **Contractor** an opportunity to be heard, upon not less than two (2) **Days'** notice.

ARTICLE 49. EXERCISE OF THE RIGHT TO DECLARE DEFAULT

49.1 The right to declare the **Contractor** in default for any of the grounds specified or referred to in Article 48 shall be exercised by sending the **Contractor** a notice, signed by the **Commissioner**, setting forth the ground or grounds upon which such default is declared (hereinafter referred to as a "Notice of Default").

49.2 The **Commissioner's** determination that the **Contractor** is in default shall be conclusive, final, and binding on the parties and such a finding shall preclude the **Contractor** from commencing a plenary action for any damages relating to the **Contract**. If the **Contractor** protests the determination of the **Commissioner**, the **Contractor** may commence an action in a court of competent jurisdiction of the State of New York under Article 78 of the New York Civil Practice Law and Rules.

ARTICLE 50. QUITTING THE SITE

50.1 Upon receipt of such notice the **Contractor** shall immediately discontinue all further operations under this **Contract** and shall immediately quit the **Site**, leaving untouched all plant, materials, equipment, tools, and supplies then on the **Site**.

ARTICLE 51. COMPLETION OF THE WORK

51.1 The **Commissioner**, after declaring the **Contractor** in default, may then have the **Work** completed by such means and in such manner, by contract with or without public letting, or otherwise, as he/she may deem advisable, utilizing for such purpose such of the **Contractor's** plant, materials, equipment, tools, and supplies remaining on the **Site**, and also such **Subcontractors**, as he/she may deem advisable.

51.2 After such completion, the **Commissioner** shall make a certificate stating the expense incurred in such completion, which shall include the cost of re-letting and also the total amount of liquidated damages (at the rate provided for in the **Contract**) from the date when the **Work** should have been completed by the **Contractor** in accordance with the terms hereof to the date of actual completion of the **Work**. Such certificate shall be binding and conclusive upon the **Contractor**, its sureties, and any person claiming under the **Contractor**, as to the amount thereof.

51.3 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, and any liquidated damages assessed against the **Contractor**, shall be charged against and deducted out of monies which are earned by the **Contractor** prior to the date of default. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

ARTICLE 52. PARTIAL DEFAULT

52.1 In case the **Commissioner** shall declare the **Contractor** in default as to a part of the **Work** only, the **Contractor** shall discontinue such part, shall continue performing the remainder of the **Work** in strict conformity with the terms of this **Contract**, and shall in no way hinder or interfere with any **Other Contractor(s)** or persons whom the **Commissioner** may engage to complete the **Work** as to which the **Contractor** was declared in default.

52.2 The provisions of this Chapter relating to declaring the **Contractor** in default as to the entire **Work** shall be equally applicable to a declaration of partial default, except that the **Commissioner** shall be entitled to utilize for completion of the part of the **Work** as to which the **Contractor** was declared in default only such plant, materials, equipment, tools, and supplies as had been previously used by the **Contractor** on such part.

ARTICLE 53. PERFORMANCE OF UNCOMPLETED WORK

53.1 In completing the whole or any part of the **Work** under the provisions of this Chapter X, the **Commissioner** shall have the power to depart from or change or vary the terms and provisions of this **Contract**, provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variation, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the **Commissioner's** certificate of the cost of completion referred to in Article 51, nor shall it constitute a defense to an action to recover the amount by which such certificate exceeds the amount which would have been payable to the **Contractor** hereunder but for its default.

ARTICLE 54. OTHER REMEDIES

54.1 In addition to the right to declare the **Contractor** in default pursuant to this Chapter X, the **Commissioner** shall have the absolute right, in his/her sole discretion and without a hearing, to complete or cause to be completed in the same manner as described in Articles 51 and 53, any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List**. A written notice of the exercise of this right shall be sent to the **Contractor** who shall immediately quit the **Site** in accordance with the provisions of Article 50.

54.2 The expense of completion permitted under Article 54.1, including any and all related and incidental costs, as so certified by the **Commissioner**, shall be charged against and deducted out of monies which have been earned by the **Contractor** prior to the date of the exercise of the right set forth in Article 54.1; the balance of such monies, if any, subject to the other provisions of this **Contract**, to be paid to the **Contractor** without interest after such completion. Should the expense of such completion, as certified by

the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

54.3 The previous provisions of this Chapter X shall be in addition to any and all other remedies available under **Law** or in equity.

54.4 The exercise by the **City** of any remedy set forth herein shall not be deemed a waiver by the **City** of any other legal or equitable remedy contained in this **Contract** or provided under **Law**.

CHAPTER XI: MISCELLANEOUS PROVISIONS

ARTICLE 55. CONTRACTOR'S WARRANTIES

55.1 In consideration of, and to induce, the award of this **Contract** to the **Contractor**, the **Contractor** represents and warrants:

55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**; and

55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and

55.1.3 That it has read and complied with all requirements set forth in the **Contract**.

ARTICLE 56. CLAIMS AND ACTIONS THEREON

56.1 Any claim, that is not subject to dispute resolution under the **PPB** Rules or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any action, unless the **Contractor** shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as herein before provided.

56.2 Nor shall any action be instituted or maintained on any such claims unless such action is commenced within six (6) months after **Substantial Completion**; except that:

56.2.1 Any claims arising out of events occurring after **Substantial Completion** and before **Final Acceptance** of the **Work** shall be asserted within six (6) months of **Final Acceptance** of the **Work**;

56.2.2 If the **Commissioner** exercises his/her right to complete or cause to complete any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List** pursuant to Article 54, any such action shall be commenced within six (6) months from the date the **Commissioner** notifies the **Contractor** in writing that he/she has exercised such right. Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies otherwise become due and payable hereunder; and

56.2.3 If the **Commissioner** exercises his/her right to terminate the **Contract** pursuant to Article 64, any such action shall be commenced within six (6) months of the date the **Commissioner** exercises said right.

ARTICLE 57. INFRINGEMENT

57.1 The **Contractor** shall be solely responsible for and shall defend, indemnify, and hold the **City** harmless from any and all claims (even if the allegations of the lawsuit are without merit) and judgments for damages and from costs and expenses to which the **City** may be subject to or which it may suffer or incur allegedly arising out of or in connection with any infringement by the **Contractor** of any copyright, trade secrets, trademark or patent rights or any other property or personal right of any third party by the **Contractor** and/or its **Subcontractors** in the performance or completion of the **Work**. Insofar as the facts or **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent permitted by **Law**.

ARTICLE 58. NO CLAIM AGAINST OFFICIALS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any official, agent or employee of the **City** for, or on account of, anything done or omitted to be done in connection with this **Contract**.

ARTICLE 59. SERVICE OF NOTICES

59.1 The **Contractor** hereby designates the business address, fax number, and email address specified in its bid, as the place where all notices, directions or other communications to the **Contractor** may be delivered, or to which they may be mailed. Any notice, direction, or communication from either party to the other shall be in writing and shall be deemed to have been given when (i) delivered personally; (ii) sent by certified mail, return receipt requested; (iii) delivered by overnight or same day courier service in a properly addressed envelope with confirmation; or (iv) sent by fax or email and, unless receipt of the fax or e-mail is acknowledged by the recipient by fax or e-mail, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed, postage pre-paid envelope.

59.2 **Contractor's** notice address, email address, or fax number may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor**, and delivered to the **Commissioner**.

59.3 Nothing herein contained shall, however, be deemed to preclude or render inoperative the service of any notice, direction or other communication upon the **Contractor** personally, or, if the **Contractor** is a corporation, upon any officer thereof.

ARTICLE 60. UNLAWFUL PROVISIONS DEEMED STRICKEN FROM CONTRACT

60.1 If this **Contract** contains any unlawful provision not an essential part of the **Contract** and which shall not appear to have been a controlling or material inducement to the making thereof, the same shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the **Contract** without affecting the binding force of the remainder.

ARTICLE 61. ALL LEGAL PROVISIONS DEEMED INCLUDED

61.1 It is the intent and understanding of the parties to this **Contract** that each and every provision of **Law** required to be inserted in this **Contract** shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this **Contract** shall forthwith upon the application of either party be amended by such insertion so as to comply strictly with the **Law** and without prejudice to the rights of either party hereunder.

ARTICLE 62. TAX EXEMPTION

62.1 The **City** is exempt from payment of Federal, State, and local taxes, including sales and compensating use taxes of the State of New York and its cities and counties on all tangible personal property sold to the **City** pursuant to the provisions of this **Contract**. These taxes are not to be included in bids. However, this exemption does not apply to tools, machinery, equipment or other property leased by or to the **Contractor**, **Subcontractor** or **Materialman** or to tangible personal property which, even though it is consumed, is not incorporated into the completed **Work** (consumable supplies) and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**. The **Contractor** and its **Subcontractors** and **Materialmen** shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all tangible personal property, other than consumable supplies and other tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**, that is required, necessary or proper for or incidental to the construction of the **Project** covered by this **Contract**. The sum paid under this **Contract** for such tangible personal property shall be in full payment and consideration for the sale of such tangible personal property.

62.2.1 The **Contractor** agrees to construct the **Project** and to perform all **Work**, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such **Work**, labor, and services, and the sum so paid pursuant to this **Contract** for such **Work**, labor, and services, shall be in full consideration for the performance by the **Contractor** of all its duties and obligations under this **Contract** in connection with said **Work**, labor, and services.

62.3 20 NYCRR Section 541.3(d) provides that a **Contractor's** purchases of tangible personal property that is either incorporated into real property owned by a governmental entity or purchased for and sold to a governmental entity are exempt from sales and use tax. The **City** shall not pay sales tax for any such tangible personal property that it purchases from the **Contractor** pursuant to the **Contract**. With respect to such tangible personal property, the **Contractor**, at the request of the **City**, shall furnish to the **City** such bills of sale and other instruments as may be required by the **City**, properly executed, acknowledged and delivered assuring to the **City** title to such tangible personal property, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such tangible personal property as the property of the **City**.

62.4 Title to all tangible personal property to be sold by the **Contractor** to the **City** pursuant to the provisions of the **Contract** shall immediately vest in and become the sole property of the **City** upon delivery of such tangible personal property to the **Site**. Notwithstanding such transfer of title, the **Contractor** shall

have the full and continuing responsibility to install such tangible personal property in accordance with the provisions of this **Contract**, protect it, maintain it in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional tangible personal property in place of any that may be lost, stolen or rendered unusable, without cost to the **City**, until such time as the **Work** covered by the **Contract** is fully accepted by the **City**. Such transfer of title shall in no way affect any of the **Contractor's** obligations hereunder. In the event that, after title has passed to the **City**, any of the tangible personal property is rejected as being defective or otherwise unsatisfactory, title to all such tangible personal property shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** or **Materialmen** of tangible personal property to be sold hereunder shall be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid sales and compensating use taxes, provided that the subcontracts and purchase agreements provide for the resale of such tangible personal property and that such subcontracts and purchase agreements are in a form similar to this **Contract** with respect to the separation of the sale of consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work** from the **Work** and labor, services, and any other matters to be provided, and provided further that the subcontracts and purchase agreements provide separate prices for tangible personal property and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for tangible personal property from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and **Materialmen** shall furnish a **Contractor** Exempt Purchase Certificate to all persons, firms or corporations from which they purchase tangible personal property for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this Article 62 shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this Article 62 shall control.

ARTICLE 63. INVESTIGATION(S) CLAUSE

63.1 The parties to this **Contract** agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a **City** governmental agency or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental agency that is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit or license that is the subject of the investigation, audit or inquiry.

63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the **City**, or any public benefit corporation organized under the **Laws** of the State of New York, or;

63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a **City** or State governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental agency that is a party in interest in, and is

seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision thereof or any local development corporation within the **City**, then;

63.4 The **Commissioner** whose **Agency** is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license shall convene a hearing, upon not less than five (5) **Days**' written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

63.5 If any non-governmental party to the hearing requests an adjournment, the **Commissioner** who convened the hearing may, upon granting the adjournment, suspend any contract, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the **City** incurring any penalty or damages for delay or otherwise.

63.6 The penalties which may attach after a final determination by the **Commissioner** may include but shall not exceed:

63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any contract, lease, permit or license with or from the **City**; and/or

63.6.2 The cancellation or termination of any and all such existing **City** contracts, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this **Contract**, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the **City** incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, work done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the **City**.

63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:

63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

63.7.3 The nexus of the testimony sought to the subject entity and its contracts, leases, permits or licenses with the **City**.

63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party

or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

63.8 Definitions:

63.8.1 The term “license” or “permit” as used in this Article 63 shall be defined as a license, permit, franchise or concession not granted as a matter of right.

63.8.2 The term “person” as used in this Article 63 shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.

63.8.3 The term “entity” as used in this Article 63 shall be defined as any firm, partnership, corporation, association, joint venture, or person that receives monies, benefits, licenses, leases, or permits from or through the **City** or otherwise transacts business with the **City**.

63.8.4 The term “member” as used in this Article 63 shall be defined as any person associated with another person or entity as a partner, director, officer, principal or employee.

63.9 In addition to and notwithstanding any other provision of this **Contract**, the **Commissioner** may in his/her sole discretion terminate this **Contract** upon not less than three (3) **Days**’ written notice in the event the **Contractor** fails to promptly report in writing to the **Commissioner** of the Department of Investigations (“DOI”) of the **City** any solicitation of money, goods, requests for future employment or other benefit or thing of value, by or on behalf of any employee of the **City** or other person, firm, corporation or entity for any purpose which may be related to the procurement or obtaining of this **Contract** by the **Contractor**, or affecting the performance of this **Contract**.

ARTICLE 64. TERMINATION BY THE CITY

64.1 In addition to termination pursuant to any other article of this **Contract**, the **Commissioner** may, at any time, terminate this **Contract** by written notice to the **Contractor**. In the event of termination, the **Contractor** shall, upon receipt of such notice, unless otherwise directed by the **Commissioner**:

64.1.1 Stop **Work** on the date specified in the notice;

64.1.2 Take such action as may be necessary for the protection and preservation of the **City**’s materials and property;

64.1.3 Cancel all cancelable orders for material and equipment;

64.1.4 Assign to the **City** and deliver to the **Site** or another location designated by the **Commissioner**, any non-cancelable orders for material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract** and not incorporated in the **Work**;

64.1.5 Take no action which will increase the amounts payable by the **City** under this
64.1.5 **Contract**.

64.2 In the event of termination by the **City** pursuant to this Article 64, payment to the **Contractor** shall be in accordance with Articles 64.2.1, 64.2.2 or 64.2.3, to the extent that each respective article applies.

64.2.1 Lump Sum Contracts or Items: On all lump sum **Contracts**, or on lump sum items in a **Contract**, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.1(a) and 64.2.1(b), less all payments previously made pursuant to this **Contract**. On lump sum **Contracts** only, the **City** will also pay the **Contractor** an additional sum as provided in Article 64.2.1(c).

64.2.1(a) For **Work** completed prior to the notice of termination, the **Contractor** shall be paid a pro rata portion of the lump sum bid amount, plus approved change orders, based upon the percent completion of the **Work**, as determined by the **Commissioner**. For the purpose of determining the pro rata portion of the lump sum bid amount to which the **Contractor** is entitled, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be dispositive. The **Commissioner's** determination hereunder shall be final, binding, and conclusive.

64.2.1(b) For non-cancelable material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated in the **Work**, the **Contractor** shall be paid the lesser of the following, less salvage value:

64.2.1(b)(i) The Direct Cost, as defined in Article 64.2.4; or

64.2.1(b)(ii) The fair and reasonable value, if less than Direct Cost, of such material and equipment, plus necessary and reasonable delivery costs.

64.2.1(b)(iii) In addition, the **Contractor** shall be paid five (5%) percent of the amount described in Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.

64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):

64.2.1(c)(i) Five (5%) percent of the first five million (\$5,000,000) dollars; and

64.2.1(c)(ii) Three (3%) percent of any amount between five million (\$5,000,000) dollars and fifteen million (\$15,000,000) dollars; plus

64.2.1(c)(iii) One (1%) percent of any amount over fifteen million (\$15,000,000) dollars.

64.2.1(d) In the event the **City** terminates a lump sum **Contract** pursuant to this Article 64 within ninety (90) **Days** after registration of the **Contract** with the **Comptroller**, the **Contractor** shall be paid one (1%) percent of the difference between the lump sum bid amount and the total of all payments made pursuant to this Article 64.2.

64.2.2 Unit Price Contracts or Items: On all unit price **Contracts**, or on unit price items in a

Contract, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this **Contract**:

64.2.2(a) For all completed units, the unit price stated in the **Contract**, and

64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:

64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and

64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).

64.2.3 Time and Materials Contracts or Items Based on Time and Material Records: On all **Contracts** or items in a **Contract** where payment for the **Work** is based on time and material records, the **Contractor** shall be paid in accordance with Article 26, less all payments previously made pursuant to this **Contract**.

64.2.4 Direct Costs: Direct Costs as used in this Article 64.2 shall mean:

64.2.4(a) The actual purchase price of material and equipment, plus necessary and reasonable delivery costs,

64.2.4(b) The actual cost of labor involved in construction and installation at the **Site**, and

64.2.4(c) The actual cost of necessary bonds and insurance purchased pursuant to requirements of this **Contract** less any amounts that have been or should be refunded by the **Contractor's** sureties or insurance carriers.

64.2.4(d) Direct Costs shall not include overhead.

64.3 In no event shall any payments under this Article 64 exceed the **Contract** price for such items.

64.4 All payments pursuant to Article 64 shall be in the nature of liquidated damages and shall be accepted by the **Contractor** in full satisfaction of all claims against the **City**.

64.5 The **City** may deduct or set off against any sums due and payable pursuant to this Article 64, any deductions authorized by this **Contract** or by **Law** (including but not limited to liquidated damages) and any claims it may have against the **Contractor**. The **City's** exercise of the right to terminate the **Contract** pursuant to this Article 64 shall not impair or otherwise effect the **City's** right to assert any claims it may have against the **Contractor** in a plenary action.

64.6 Where the **Work** covered by the **Contract** has been substantially completed, as determined in writing by the **Commissioner**, termination of the **Work** shall be handled as an omission of **Work** pursuant to Articles 29 and 33, in which case a change order will be issued to reflect an appropriate reduction in the **Contract** sum, or if the amount is determined after final payment, such amount shall be paid by the **Contractor**.

ARTICLE 65. CHOICE OF LAW, CONSENT TO JURISDICTION AND VENUE

65.1 This **Contract** shall be deemed to be executed in the **City** regardless of the domicile of the **Contractor**, and shall be governed by and construed in accordance with the **Laws** of the State of New York and the **Laws** of the United States, where applicable.

65.2 The parties agree that any and all claims asserted against the **City** arising under this **Contract** or related thereto shall be heard and determined in the courts of the State of New York (“New York State Courts”) located in the **City** and County of New York. To effect this **Contract** and intent, the **Contractor** agrees:

65.2.1 If the **City** initiates any action against the **Contractor** in Federal court or in a New York State Court, service of process may be made on the **Contractor** either in person, wherever such **Contractor** may be found, or by registered mail addressed to the **Contractor** at its address as set forth in this **Contract**, or to such other address as the **Contractor** may provide to the **City** in writing; and

65.2.2 With respect to any action between the **City** and the **Contractor** in a New York State Court, the **Contractor** hereby expressly waives and relinquishes any rights it might otherwise have:

65.2.2(a) To move to dismiss on grounds of forum non conveniens;

65.2.2(b) To remove to Federal Court; and

65.2.2(c) To move for a change of venue to a New York State Court outside New York County.

65.2.3 With respect to any action brought by the **City** against the **Contractor** in a Federal Court located in the **City**, the **Contractor** expressly waives and relinquishes any right it might otherwise have to move to transfer the action to a Federal Court outside the **City**.

65.2.4 If the **Contractor** commences any action against the **City** in a court located other than in the **City** and County of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a New York State Court of competent jurisdiction located in the **City** and County of New York or, if the Court where the action is initially brought will not or cannot transfer the action, the **Contractor** shall consent to dismiss such action without prejudice and may thereafter reinstate the action in a New York State Court of competent jurisdiction in New York County.

65.3 If any provision(s) of this Article 65 is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT

66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Federal Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce (Commerce Department) promulgated thereunder.

66.2 Upon the final determination by the Commerce Department or any other agency of the United States as to, or conviction of the **Contractor** or a substantially-owned affiliated company thereof for participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the **Comptroller** may, at his/her option, render forfeit and void this **Contract**.

66.3 The **Contractor** shall comply in all respects, with the provisions of Section 6-114 of the Administrative Code and the rules and regulations issued by the **Comptroller** thereunder.

ARTICLE 67. LOCALLY BASED ENTERPRISE PROGRAM

67.1 This **Contract** is subject to the requirements of Section 6-108.1 of the Administrative Code and regulations promulgated thereunder. No construction contract shall be awarded unless and until these requirements have been complied with in their entirety; however, compliance with this Article 67 is not required if the Agency sets Subcontractor Participation Goals for Minority- and Women-Owned Business Enterprises (M/WBEs).

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the **City** Department of Business Services, if any portion of the **Contract** is subcontracted, not less than ten (10%) percent of the total dollar amount of the **Contract** shall be awarded to locally based enterprises (LBEs); except that where less than ten (10%) percent of the total dollar amount of the **Contract** is subcontracted, such lesser percentage shall be so awarded.

67.3 The **Contractor** shall not require performance and payment bonds from LBE **Subcontractors**.

67.4 If the **Contractor** has indicated prior to award that no **Work** will be subcontracted, no **Work** shall be subcontracted without the prior approval of the **Commissioner**, which shall be granted only if the **Contractor** makes a good faith effort beginning at least six (6) weeks before the **Work** is to be performed to obtain LBE **Subcontractors** to perform the **Work**.

67.5 If the **Contractor** has not identified sufficient LBE **Subcontractors** prior to award, it shall sign a letter of compliance stating that it complies with Section 6-108.1 of the Administrative Code, recognizes that achieving the LBE requirement is a condition of its **Contract**, and shall submit documentation demonstrating its good faith efforts to obtain LBEs. After award, the **Contractor** shall begin to solicit LBE's to perform subcontracted **Work** at least six (6) weeks before the date such **Work** is to be performed and shall demonstrate that a good faith effort has been made to obtain LBEs on each subcontract until it meets the required percentage.

67.6 Failure of the **Contractor** to comply with the requirements of Section 6-108.1 of the Administrative Code and the regulations promulgated thereunder shall constitute a material breach of this **Contract**. Remedy for such breach may include the imposition of any or all of the following sanctions:

67.6.1 Reducing the **Contractor's** compensation by an amount equal to the dollar value of the percentage of the LBE subcontracting requirement not complied with;

67.6.2 Declaring the **Contractor** in default;

67.6.3 If the **Contractor** is an LBE, de-certifying and declaring the **Contractor** ineligible to participate in the LBE program for a period of up to three (3) years.

ARTICLE 68. ANTITRUST

68.1 The **Contractor** hereby assigns, sells, and transfers to the **City** all right, title, and interest in and to any claims and causes of action arising under the antitrust **Laws** of New York State or of the United States relating to the particular goods or services purchased or procured by the **City** under this **Contract**.

ARTICLE 69. MacBRIDE PRINCIPLES PROVISIONS

69.1 Notice To All Prospective **Contractors**:

69.1.1 Local Law No. 34 of 1991 became effective on September 10, 1991 and added Section 6-115.1 of the Administrative Code. The local **Law** provides for certain restrictions on **City Contracts** to express the opposition of the people of the **City** to employment discrimination practices in Northern Ireland to promote freedom of work-place opportunity.

69.1.2 Pursuant to Section 6-115.1, prospective **Contractors** for **Contracts** to provide goods or services involving an expenditure of an amount greater than ten thousand (\$10,000.) dollars, or for construction involving an amount greater than fifteen thousand (\$15,000.) dollars, are asked to sign a rider in which they covenant and represent, as a material condition of their **Contract**, that any business operations in Northern Ireland conducted by the **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** will be conducted in accordance with the MacBride Principles of nondiscrimination in employment.

69.1.3 Prospective **Contractors** are not required to agree to these conditions. However, in the case of **Contracts** let by competitive sealed bidding, whenever the lowest responsible bidder has not agreed to stipulate to the conditions set forth in this notice and another bidder who has agreed to stipulate to such conditions has submitted a bid within five (5%) percent of the lowest responsible bid for a **Contract** to supply goods, services or construction of comparable quality, the **Agency** shall refer such bids to the Mayor, the Speaker or other officials, as appropriate, who may determine, in accordance with applicable **Law**, that it is in the best interest of the **City** that the **Contract** be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the **City** Charter.

69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City** Council shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.

69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:

69.2.1 Have no business operations in Northern Ireland, or

69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in

Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

69.3 For purposes of this Article, the following terms shall have the following meanings:

69.3.1 “MacBride Principles” shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:

69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;

69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling to and from **Work**;

69.3.1(c) ban provocative religious or political emblems from the workplace;

69.3.1(d) publicly advertise all job openings and make special recruitment efforts to attract applicants from under-represented religious groups;

69.3.1(e) establish layoff, recall, and termination procedures which do not in practice favor a particular religious group;

69.3.1(f) abolish all job reservations, apprenticeship restrictions and different employment criteria which discriminate on the basis of religion;

69.3.1(g) develop training programs that will prepare substantial numbers of current employees from under-represented religious groups for skilled jobs, including the expansion of existing programs and the creation of new programs to train, upgrade, and improve the skills of workers from under-represented religious groups;

69.3.1(h) establish procedures to assess, identify, and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative action efforts and develop a timetable to ensure their full implementation.

69.4 The **Contractor** agrees that the covenants and representations in Article 69.2 are material conditions to this **Contract**. In the event the **Agency** receives information that the **Contractor** who made the stipulation required by this Article 69 is in violation thereof, the **Agency** shall review such information and give the **Contractor** an opportunity to respond. If the **Agency** finds that a violation has occurred, the **Agency** shall have the right to declare the **Contractor** in default and/or terminate this **Contract** for cause and procure supplies, services or **Work** from another source in the manner the **Agency** deems proper. In the event of such termination, the **Contractor** shall pay to the **Agency**, or the **Agency** in its sole discretion may withhold from any amounts otherwise payable to the **Contractor**, the difference between the **Contract** price for the uncompleted portion of this **Contract** and the cost to the **Agency** of completing performance of this **Contract** either itself or by engaging another **Contractor** or **Contractors**. In the case of a requirement **Contract**, the **Contractor** shall be liable for such difference in price for the entire amount of supplies required by the **Agency** for the uncompleted term of **Contractor's Contract**. In the case of a construction **Contract**, the **Agency** shall also have the right to hold the **Contractor** in partial or total default in

accordance with the default provisions of this **Contract**, and/or may seek debarment or suspension of the **Contractor**. The rights and remedies of the **Agency** hereunder shall be in addition to, and not in lieu of, any rights and remedies the **Agency** has pursuant to this **Contract** or by operation of **Law**.

ARTICLE 70. ELECTRONIC FILING/NYC DEVELOPMENT HUB

70.1 The **Contractor** shall electronically file all alteration type-2 and alteration type-3 applications via the New York City Development Hub Web site, except applications for the following types of minor alterations: enlargements, curb cuts, legalizations, fire alarms, builders pavement plans, and jobs filed on Landmark Preservation Commission calendared properties. All such filings must be professionally certified. Information about electronic filing via the New York City Development Hub is available on the **City** Department of Buildings Web site at www.nyc.gov/buildings.

ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law (Finance Law), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the **City** Charter and other related provisions of the **City** Charter, the Administrative Code, and the Penal Law are applicable under the terms of this **Contract** in relation to conflicts of interest and shall be extended to **Subcontractors** authorized to perform **Work**, labor and services pursuant to this **Contract** and further, it shall be the duty and responsibility of the **Contractor** to so inform its respective **Subcontractors**. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

ARTICLE 73. MERGER CLAUSE

73.1 The written **Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

ARTICLE 74. STATEMENT OF WORK

74.1 The **Contractor** shall furnish all labor and materials and perform all **Work** in strict accordance with the **Specifications** and **Addenda** thereto, numbered as shown in Schedule A.

ARTICLE 75. COMPENSATION TO BE PAID TO CONTRACTOR

75.1 The **City** will pay and the **Contractor** will accept in full consideration for the performance of the **Contract**, subject to additions and deductions as provided herein, the total sum shown in Schedule A, this said sum being the amount at which the **Contract** was awarded to the **Contractor** at a public letting thereof, based upon the **Contractor's** bid for the **Contract**.

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

76.1 In accordance with Section 6-107.1 of the Administrative Code, the **Contractor** agrees to accept payments under this **Contract** from the **City** by electronic funds transfer (EFT). An EFT is any transfer of funds, other than a transaction originated by check, draft or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. Prior to the first payment made under this **Contract**, the **Contractor** shall designate one financial institution or other authorized payment agent and shall complete the attached "EFT Vendor Payment Enrollment Form" in order to provide the Commissioner of the **City** Department of Finance with information necessary for the **Contractor** to receive electronic funds transfer payments through a designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the **Contractor** shall constitute full satisfaction by the **City** for the amount of the payment under this **Contract**. The account information supplied by the **Contractor** to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by **Law**.

76.2 The **Commissioner** may waive the application of the requirements of this Article 76 to payments on contracts entered into pursuant to Section 315 of the **City** Charter. In addition, the Commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to which the **Agency** may waive the requirements of this Article 76 for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications or types of checks; or (iii) in other circumstances as may be necessary in the interest of the **City**.

ARTICLE 77. RECORDS RETENTION

77.1 The **Contractor** agrees to retain all books, records, and other documents relevant to this **Contract** for six years after the final payment or termination of this **Contract**, whichever is later. **City**, state, and federal auditors and any other persons duly authorized by the **City** shall have full access to and the right to examine any such books, records, and other documents during the retention period.

ARTICLE 78. EXAMINATION AND VIEWING OF SITE, CONSIDERATION OF OTHER SOURCES OF INFORMATION AND CHANGED SITE CONDITIONS

78.1 Pre-Bidding (Investigation) Viewing of Site – Bidders must carefully view and examine the **Site** of the proposed **Work**, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions and hazards on, about or above the **Site** relating to or affecting in any way the performance of the **Work** to be done under the **Contract** that were or should have been known by a reasonably prudent bidder. To arrange a date for visiting the **Site**,

bidders are to contact the **Agency** contact person specified in the bid documents.

78.2 Should the **Contractor** encounter during the progress of the Work site conditions or environmental hazards at the **Site** materially differing from any shown on the **Contract Drawings** or indicated in the **Specifications** or such conditions or environmental hazards as could not reasonably have been anticipated by the **Contractor**, which conditions or hazards will materially affect the cost of the **Work** to be done under the **Contract**, the attention of the **Commissioner** must be called immediately to such conditions or hazards before they are disturbed. The **Commissioner** shall thereupon promptly investigate the conditions or hazards. If the **Commissioner** finds that they do so materially differ, and that they could not have been reasonably anticipated by the **Contractor**, the **Contract** may be modified with the **Commissioner's** written approval.

ARTICLE 79. PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT

ARTICLE I. M/WBE PROGRAM

Section 6-129 of the Administrative Code of the City of New York (“Section 6-129”) establishes the program for participation in City procurement (“M/WBE Program”) by minority- owned business enterprises (“MBEs”) and women-owned business enterprises (“WBEs”), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6- 129, the intent of the program is to address the impact of discrimination on the City’s procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services (“DSBS”) promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the “M/WBE Utilization Plan”) and are detailed below.

The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129.

References to MBEs or WBEs shall also include such businesses certified pursuant to the executive law where credit is required by section 311 of the New York City Charter or other provision of law.

Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts.

Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A: PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

1. The MBE and/or WBE Participation Goals established for this Contract or Task Orders issued pursuant to this Contract, (“Participation Goals”), as applicable, are set forth on Schedule B, Part 1 to this Contract (see Page 1, Line 1 Total Participation Goals) or will be set forth on Schedule B, Part 1 to Task Orders issued pursuant to this Contract, as applicable.

The Participation Goals represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with DSBS as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If Participation Goals have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the Participation Goals, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If Participation Goals have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant Participation Goal, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant Participation Goal. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If Participation Goals have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part 2 (see Pages 1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor's required certification and affirmations. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE Participation Goals, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part 2 (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed non-responsive.

(ii) Participation Goals on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If Participation Goals have been established on a Task Order, a contractor shall be required to submit a Schedule B – M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part 2 (see Pages 1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor's required certification and affirmations. The contractor must engage in good faith efforts to meet the Participation Goals as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART 2). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART 3). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi- year contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the Participation Goals. Such certification must occur prior to the firms' commencement of work. A list of city-certified MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6451, or by visiting or writing DSBS at One Liberty Plaza ., New York, New York, 10006, 11th floor. Eligible firms that have not yet

been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to, the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's M/WBE Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its M/WBE Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an M/WBE Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the Participation Goals should be modified.

10. Pre-award waiver of the Participation Goals. (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the Participation Goals in accordance with Section 6-129, which requests that Agency change one or more Participation Goals on the grounds that the Participation Goals are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

(b) To apply for a full or partial waiver of the Participation Goals, a bidder, proposer, or contractor, as applicable, must complete Part 3 of Schedule B and **submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing by email at MWBEModification@ddc.nyc.gov. Full or partial waiver requests that are received later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due may be rejected as untimely.** Bidders, proposers, or contractors, as applicable, who have submitted timely requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the Participation Goals are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the Participation Goals to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its M/WBE Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited

to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the Participation Goals. In making such determination, Agency may consider whether the M/WBE Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. Modification of M/WBE Utilization Plan. (a) A Contractor may request a modification of its M/WBE Utilization Plan after award of this Contract. PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's M/WBE Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

- (i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
- (ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;
- (iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the M/WBE Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
- (vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;
- (vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
- (viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the Participation Goals when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its M/WBE Utilization Plan would be awarded to subcontractors.

12. If the Contractor was required to identify in its bid or proposal the MBEs and/or WBEs they intended to use in connection with the performance of the Contract or Task Order, substitutions to the identified firms may only be made with the approval of the Agency, which shall only be given when the Contractor has proposed to use a firm that would satisfy the Participation Goals to the same extent as the firm previously identified, unless the Agency determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts. In making such determination, the Agency shall require evidence of the

efforts listed in Section 11(a) above, as applicable, along with any other relevant factors.

13. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an M/WBE Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the Participation Goals, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

14. If Participation Goals have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its M/WBE Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

15. If Participation Goals have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B: MISCELLANEOUS

The Contractor shall take notice that, if this solicitation requires the establishment of a M/WBE Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the M/WBE Utilization Plan.

1. Pursuant to DSBS rules, construction contracts that include a requirement for a M/WBE Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.

2. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.

3. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).

4. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required Participation Goals.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129

or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any M/WBE Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.

3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any M/WBE Utilization Plan, Agency may determine that one of the following actions should be taken:

- (a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
- (b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
- (c) making a finding that the Contractor is in default of the Contract;
- (d) terminating the Contract;
- (e) declaring the Contractor to be in breach of Contract;
- (f) withholding payment or reimbursement;
- (g) determining not to renew the Contract;
- (h) assessing actual and consequential damages;
- (i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;
- (j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or
- (k) taking any other appropriate remedy.

4. If an M/WBE Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its Participation Goals contained in its M/WBE Utilization Plan or the Participation Goals as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the Participation Goals and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Participation Goals, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its M/WBE Utilization Plan shall be a factor in the evaluation of

its performance. Whenever Agency determines that a Contractor's compliance with an M/WBE Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in PASSPort as caution data.

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

Exhibit A

Project Labor Agreement - Letter of Assent

Dear: TO WHOM IT MAY CONCERN.

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as the NYC Agency Renovation and located at NYPD BOMB SQUAD BUILDING (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto:
- (2) Agrees to be bound by the legally established collective bargaining agreements; local trust agreements for employee benefit funds; and trust documents for joint apprentice programs as well as apprentice program rules and procedures but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Provide description of the Work, identify craft jurisdiction(s) and all contract numbers below:

Local Union: 79

Description of Work: GENERAL CLEANUP AND HOUSE KEEPING,

SAFETY

Contract Number(s): 85023B0022 SANDBOUB

2020 NYC AGENCY NEW CONSTRUCTION PROJECT LABOR AGREEMENT

Dated: 4/3/2023

E & A RESTORATION INC.
(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

Jenny Sakalis, President
(Authorized Officer & Title)

130 crossways Park Dr, suite 101
Woodbury, NY 11791
(Address)

Jenny Sakalis
(Signature)

516 921-7030 / F 516 921-0259
(Phone) (Fax)

Contractor's State License

Sworn to before me this
3rd day of April, 2023

Joanne Depalma
Notary Public

JOANNE DEPALMA San Francisco
NOTARY PUBLIC - STATE OF NEW YORK
NO. 01DE6192507
QUALIFIED IN SUFFOLK COUNTY
COMMISSION EXPIRES SEPTEMBER 2, 2024

IN WITNESS WHEREOF, the Commissioner, on behalf of the City of New York, and the Contractor, have executed this agreement in quadruplicate, two parts of which are to remain with the Commissioner, another to be filed with the Comptroller of the City, and the fourth to be delivered to the Contractor.

THE CITY OF NEW YORK

By: _____


Commissioner

CONTRACTOR:

By: _____


(Member of Firm or Officer of Corporation) Jenny Sakalis

Title: _____

President

(Where Contractor is a Corporation, add):
Attest:



Secretary

(Seal)



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

11/09/2023

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Crossways Insurance Services LLC 445 Broad Hollow Road Suite 25 Melville, NY 11747	CONTACT NAME: Manoli Kalamotousakis PHONE (A/C. No. Ext): (516) 234-6961 E-MAIL ADDRESS: info@crosswaysinsurance.com	FAX (A/C. No):
	INSURER(S) AFFORDING COVERAGE	
INSURED E&A Restoration Inc. 130 Crossways Park Drive Suite 101 Woodbury, NY 11797	INSURER A: The Phoenix Insurance Company	NAIC # 25623
	INSURER B: The Travelers Indemnity Company	25682
	INSURER C: Philadelphia Indemnity Insurance Company	18058
	INSURER D: Shelterpoint Life Insurance Co.	81434
	INSURER E:	

COVERAGES

CERTIFICATE NUMBER: 2023-24 Template v2

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY			DT1N-CO-3W988226-PHX-23	2/27/2023	2/27/2024	EACH OCCURRENCE	\$ 2,000,000
	<input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	\$ 300,000
	<input checked="" type="checkbox"/> Contractual Liability						MED EXP (Any one person)	\$ 10,000
	GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:						PERSONAL & ADV INJURY	\$ 2,000,000
							GENERAL AGGREGATE	\$ 4,000,000
							PRODUCTS - COMP/OP AGG	\$ 4,000,000
							Employee Benefits	\$ 1,000,000
B	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY			BA-3W988030-23	2/27/2023	2/27/2024	COMBINED SINGLE LIMIT (Ea accident)	\$ 1,000,000
	<input checked="" type="checkbox"/> ANY AUTO						BODILY INJURY (Per person)	\$
	<input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY						BODILY INJURY (Per accident)	\$
							PROPERTY DAMAGE (Per accident)	\$
							\$	
B	<input checked="" type="checkbox"/> UMBRELLA LIAB			CUP-3W988367-23	2/27/2023	2/27/2024	EACH OCCURRENCE	\$ 5,000,000
	<input checked="" type="checkbox"/> EXCESS LIAB						AGGREGATE	\$ 5,000,000
	DED		RETENTION \$				\$	
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			UB-5W769719-23-26-G	4/1/2023	4/1/2024	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	<input type="checkbox"/> Y <input type="checkbox"/> N	N/A				E.L. EACH ACCIDENT	\$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	\$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	\$ 1,000,000
C	Excess Liability			PHUB804318	2/27/2023	2/27/2024	Each Occ./Agg.	4,000,000
D	NYS Disability			DBL224598	1/1/2023	12/31/2023	Statutory	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: DDC Project # SANDBOMB / NYPD Bomb Squad Building

Subject to the terms and conditions of the policies, the following are included as additional insureds on a primary and non-contributory basis with a waiver of subrogation in their favor for both ongoing and completed operations: City of New York, including its officials and employees; and NYC Department of Design & Construction.

CERTIFICATE HOLDER**CANCELLATION**

NYC Department of Design & Construction 30-30 Thomson Avenue Long Island City, NY 11101	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE Manoli Kalamotousakis <i>Manoli Kalamotousakis</i>
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CITY OF NEW YORK
CERTIFICATION BY INSURANCE BROKER OR AGENT

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

Crossways Insurance Services LLC

[Name of broker or agent (typewritten)]

445 Broad Hollow Road, Suite 25, Melville, NY 11747

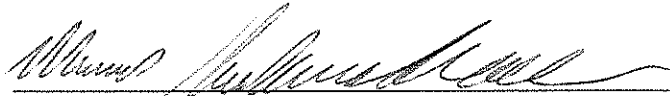
[Address of broker or agent (typewritten)]

info@crosswaysinsurance.com

[Email address of broker or agent (typewritten)]

(516) 234-6961

[Phone number/Fax number of broker or agent (typewritten)]



[Signature of authorized official, broker, or agent]

Manoli Kalamotousakis, President

[Name and title of authorized official, broker, or agent (typewritten)]

State of New York)

County of Nassau) ss.:

Sworn to before me this 9th day of Nov. 2023



NOTARY PUBLIC FOR THE STATE OF New York

MARTHA ENSTAD
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01EN6386914
Qualified in Suffolk County
Commission Expires Feb. 4th 2027



CERTIFICATE OF INSURANCE COVERAGE
NYS DISABILITY AND PAID FAMILY LEAVE BENEFITS LAW

PART 1. To be completed by NYS disability and Paid Family Leave benefits carrier or licensed insurance agent of that carrier

1a. Legal Name & Address of Insured (use street address only)
C.A.C Industries, Inc.
54 08 Vernon Blvd
Long Island City, NY 11101
1b. Business Telephone Number of Insured
718-729-3600
1c. Federal Employer Identification Number of Insured or Social Security Number
113082726
2. Name and Address of Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)
New York City Department of Design & Construction
30-30 Thomson Avenue
Long Island City, NY 11101
3a. Name of Insurance Carrier
Arch Insurance Company
3b. Policy Number of Entity Listed in Box 1a
11DBL2168000
3c. Policy Effective Period
1/1/2023 to 12/31/2023

4. Policy provides the following benefits:
[X] A. Both disability and Paid Family Leave benefits.
[] B. Disability benefits only.
[] C. Paid Family Leave benefits only.
5. Policy covers:
[X] A. All of the employer's employees eligible under the NYS Disability and Paid Family Leave Benefits Law.
[] B. Only the following class or classes of employer's employees:

Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has NYS disability and/or Paid Family Leave benefits insurance coverage as described above.

Date Signed 4/12/2023 By [Signature]
(Signature of insurance carrier's authorized representative or NYS licensed insurance agent of that insurance carrier)
Telephone Number 201-743-3937 Name and Title James Iannicelli, AVP Accident & Health

IMPORTANT: If Boxes 4A and 5A are checked, and this form is signed by the insurance carrier's authorized representative or NYS Licensed Insurance Agent of that carrier, this certificate is COMPLETE. Mail it directly to the certificate holder.
If Box 4B, 4C or 5B is checked, this certificate is NOT COMPLETE for purposes of Section 220, Subd. 8 of the NYS Disability and Paid Family Leave Benefits Law. It must be emailed to PAU@wcb.ny.gov or it can be mailed for completion to the Workers' Compensation Board, Plans Acceptance Unit, PO Box 5200, Binghamton, NY 13902-5200.

PART 2. To be completed by the NYS Workers' Compensation Board (Only if Box 4B, 4C or 5B have been checked)

State of New York
Workers' Compensation Board
According to information maintained by the NYS Workers' Compensation Board, the above-named employer has complied with the NYS Disability and Paid Family Leave Benefits Law(Article 9 of the Workers' Compensation Law) with respect to all of their employees.
Date Signed _____ By _____
(Signature of Authorized NYS Workers' Compensation Board Employee)
Telephone Number _____ Name and Title _____

Please Note: Only insurance carriers licensed to write NYS disability and Paid Family Leave benefits insurance policies and NYS licensed insurance agents of those insurance carriers are authorized to issue Form DB-120.1. Insurance brokers are NOT authorized to issue this form.



PERFORMANCE BOND #1

Performance Bond #1 (4 Pages): Use if the total contract price is \$5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration (“SBA”)for participation in its Bond Guarantee Program.

PERFORMANCE BOND #1 (Page 1)

KNOW ALL PERSONS BY THESE PRESENTS;

That we, _____

hereinafter referred to as the “Principal,”
and, _____

hereinafter referred to as the “Surety” (“Sureties”) are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the “City” or to its successors and assigns in the penal sum of _____

(\$ _____) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full; **NOW, THEREFORE**, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal’s default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal’s default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

PERFORMANCE BOND #1 (Page 2)

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost to complete the contract as determined by the City in excess of the balance of the Contract held by the City, plus any damages or costs to which the City is entitled, up to the full amount of the above penal sum, (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof, or (3) tender a completion Contractor that is acceptable to the City. The Surety (Sureties) further agrees, at its option, either to notify the City that it elects to pay the city the cost of completion plus any applicable damages and costs under option (1) above, or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and, if the Surety elects to fully perform and complete the Work, then to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. If the Surety elects to tender payment pursuant to (1) above, then the Surety shall tender such amount within fifteen (15) business days notification from the City of the cost of completion. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and complete all Work as provided herein, or to tender a completion contractor.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, and waivers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to subcontractors shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal. Notwithstanding the above, if the City makes payments to the Principal before the time required by the contract that in the aggregate exceed \$100,000 or 10% of the Contract price, whichever is less, and that have not become earned prior to the Principal being found to be in default, then all payments made to the Principal before the time required by the Contract shall be added to the remaining contract value available to be paid for the completion of the Contract as if such sums had not been paid to the Principal, but shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and to complete all Work as provided herein, or to tender a completion contractor.

PERFORMANCE BOND #1 (Page 3)

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

_____ day of _____, 20_____.(Seal)

_____(L.S.)
Principal

(Seal)

By: _____
Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

Bond Premium Rate _____

Bond Premium Cost _____

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____; that he/she is the _____ of the corporation described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

Affix Acknowledgments and Justification of Sureties.

PERFORMANCE BOND #2

Performance Bond #2 (4 pages): Use if the total contract price is more than \$5 Million.

Bond No: PB01622700069

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2 KNOW ALL PERSONS BY THESE PRESENTS.,

That we, E&A Restoration Inc.

130 Crossways Park Drive, Suite 101

Woodbury, NY 11797

hereinafter referred to as the "Principal,"
and, Philadelphia Indemnity Insurance Company

325 Columbia Turnpike

Florham Park, NJ 07932

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum of _____

Twenty Two Million Three Hundred Thousand Dollars & 19/100.

(\$ 22,300,000.19) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for 85023B0022-SANDBOMB NYPD Bomb Squad Building-Development of a new building for the

NYPD Bomb Squad within the Rodman's Neck complex, Bronx, NY

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

PERFORMANCE BOND #2 (Page 2)

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

14th day of November 20 23

(Seal) E&A Restoration Inc. (L.S.)
Principal

(Seal) By: Jenny Sakalis, President
Surety Philadelphia Indemnity Insurance Company

(Seal) By: Patricia Von Posch, Attorney-in-Fact
Surety

(Seal) By: _____
Surety

(Seal) By: _____
Surety

(Seal) By: _____
Surety

(Seal) By: _____

Bond Premium Rate \$15.00 slide

Bond Premium Cost \$148,795.00

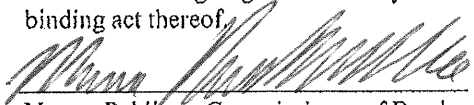
If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of New York County of Nassau ss:
On this 19th day of Nov., 2023 before me personally
came Jerry Sakalis,
to me known, who, being by me duly sworn did depose and say that he resides at
Syasset, NY; that he/she is the President
of the corporation described in and which executed the foregoing instrument; that he/she signed his/her
name to the foregoing instrument by order of the directors of said corporation as the duly authorized and
binding act thereof.


Notary Public or Commissioner of Deeds.

MANOLI KALAMOTOUSAKIS
NOTARY PUBLIC-STATE OF NEW YORK
No. 02KA6213500
Qualified in Queens County
My Commission Expires November 09, 2026

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:
On this _____ day of _____, 20 _____ before me personally
came _____,
to me known, who, being by me duly sworn did depose and say that he/she resides at _____
_____ ; that he/she is _____ partner of
_____, a limited/general partnership existing under the laws of the State of
_____, the partnership described in and which executed the foregoing instrument; and
that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said
partnership.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:
On this _____ day of _____, 20 _____ before me personally
came _____,
to me known, who, being by me duly sworn did depose and say that he/she resides at _____
_____, and that he/she is the individual whose name is
subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument,
said individual executed the instrument.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties;
(b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is
executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from
By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its
agent, officer or representative was issued, and (d) certified copy of latest published financial statement of
assets and liabilities of Surety.

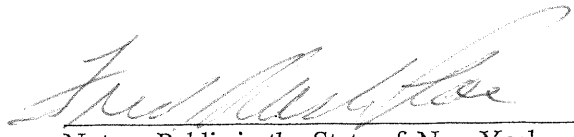
Affix Acknowledgments and Justification of Sureties.

ACKNOWLEDGMENT BY SURETY

STATE OF NEW YORK)
) ss.
County of NASSAU)

On this 14th day of November, 2023, before me personally appeared Patricia Von Posch, known to me to be the Attorney-in-Fact of Philadelphia Indemnity Insurance Company, the corporation that executed the within instrument, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, at my office in the aforesaid County, the day and year in this certificate first above written.



Notary Public in the State of New York
County of Nassau

FRED NASH ROE
Notary Public, State of New York
No. 01RO-4815494
Qualified in Nassau County
Commission Expires July 1, 2027

PHILADELPHIA INDEMNITY INSURANCE COMPANY

One Bala Plaza, Suite 100
Bala Cynwyd, PA 19004-0950

Power of Attorney

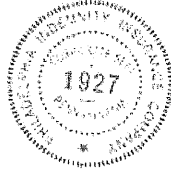
KNOW ALL PERSONS BY THESE PRESENTS: That PHILADELPHIA INDEMNITY INSURANCE COMPANY (the Company), a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, does hereby constitute and appoint John E. Roe Jr., Patricia Von Posch and Richard K. Kainz of Acrisure LLC, d/b/a City Underwriting Agency, its true and lawful Attorney-in-fact with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business and to bind the Company thereby, in an amount not to exceed \$50,000,000.

This Power of Attorney is granted and is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of PHILADELPHIA INDEMNITY INSURANCE COMPANY on the 14th of November, 2016.

RESOLVED: That the Board of Directors hereby authorizes the President or any Vice President of the Company: (1) Appoint Attorney(s) in Fact and authorize the Attorney(s) in Fact to execute on behalf of the Company bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof and to attach the seal of the Company thereto; and (2) to remove, at any time, any such Attorney-in-Fact and revoke the authority given. And, be it

FURTHER RESOLVED: That the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

IN TESTIMONY WHEREOF, PHILADELPHIA INDEMNITY INSURANCE COMPANY HAS CAUSED THIS INSTRUMENT TO BE SIGNED AND ITS CORPORATE SEAL TO BE AFFIXED BY ITS AUTHORIZED OFFICE THIS 5TH DAY OF MARCH, 2021.



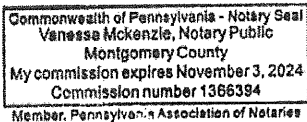
(Seal)

John Glomb, President & CEO
Philadelphia Indemnity Insurance Company

On this 5th day of March, 2021 before me came the individual who executed the preceding instrument, to me personally known, and being by me duly sworn said that he is the therein described and authorized officer of the PHILADELPHIA INDEMNITY INSURANCE COMPANY; that the seal affixed to said instrument is the Corporate seal of said Company; that the said Corporate Seal and his signature were duly affixed.

Notary Public:

Vanessa mckenzie



residing at:

Bala Cynwyd, PA

My commission expires:

November 3, 2024

I, Edward Sayago, Corporate Secretary of PHILADELPHIA INDEMNITY INSURANCE COMPANY, do hereby certify that the foregoing resolution of the Board of Directors and the Power of Attorney issued pursuant thereto on the 5th day March, 2021 are true and correct and are still in full force and effect. I do further certify that John Glomb, who executed the Power of Attorney as President, was on the date of execution of the attached Power of Attorney the duly elected President of PHILADELPHIA INDEMNITY INSURANCE COMPANY.

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this 14th day of November, 2023



Edward Sayago, Corporate Secretary
PHILADELPHIA INDEMNITY INSURANCE COMPANY

PHILADELPHIA INDEMNITY INSURANCE COMPANY

Statutory Statements of Admitted Assets, Liabilities and Capital and Surplus
(in thousands, except par value and share amounts)

<u>Admitted Assets</u>	As of December 31,	
	<u>2022</u>	<u>2021</u>
Bonds (fair value \$7,902,637 and \$8,447,694)	\$ 8,709,823	\$ 8,102,442
Preferred stocks (fair value \$14,560 and \$19,262)	14,560	19,262
Common stocks (cost \$24,136 and \$44,923)	28,395	43,194
Mortgage loans	1,074,734	957,986
Real estate	21,779	29,408
Other invested assets (cost \$212,500 and \$194,229)	234,138	218,926
Receivables for securities sold	476	152
Cash, cash equivalents and short-term investments	<u>95,212</u>	<u>128,587</u>
Cash and invested assets	10,179,117	9,499,957
Premiums receivable, agents' balances and other receivables	955,218	914,676
Reinsurance recoverable on paid loss and loss adjustment expenses	64,607	45,200
Accrued investment income	88,001	74,000
Receivable from affiliates	4,406	5,171
Federal income taxes receivable	21,231	8,144
Net deferred tax assets	150,526	141,943
Other assets	<u>11,196</u>	<u>9,953</u>
Total admitted assets	<u>\$ 11,474,302</u>	<u>\$ 10,699,044</u>
 <u>Liabilities and Capital and Surplus</u>		
<u>Liabilities:</u>		
Unpaid loss and loss adjustment expenses	\$ 5,680,508	\$ 5,436,808
Unearned premiums	1,766,050	1,658,339
Reinsurance payable on paid loss and loss adjustment expenses	39,160	35,820
Ceded reinsurance premiums payable	119,157	130,474
Commissions payable, contingent commissions and other similar charges	247,996	228,628
Funds held	82,555	77,317
Payable to affiliates	21,337	19,465
Provision for reinsurance	678	471
Payable for securities purchased	42,426	19,045
Accrued expenses and other liabilities	<u>58,292</u>	<u>47,213</u>
Total liabilities	<u>8,058,159</u>	<u>7,653,580</u>
 <u>Capital:</u>		
Common stock, par value of \$10 per share; 1,000,000 shares authorized, 450,000 shares issued and outstanding	4,500	4,500
<u>Surplus:</u>		
Gross paid-in and contributed surplus	386,071	386,071
Unassigned surplus	<u>3,025,572</u>	<u>2,654,893</u>
Total surplus	<u>3,411,643</u>	<u>3,040,964</u>
Total capital and surplus	<u>3,416,143</u>	<u>3,045,464</u>
Total liabilities and capital and surplus	<u>\$ 11,474,302</u>	<u>\$ 10,699,044</u>

The undersigned, being duly sworn, says: That she is the Executive Vice President and Chief Financial Officer of Philadelphia Indemnity Insurance Company; that said Company is a corporation duly organized in the state of Pennsylvania, and licensed and engaged in the State of Pennsylvania and has duly complied with all the requirements of the laws of the said State applicable of the said Company and is duly qualified to act as Surety under such laws; that said Company has also complied with and is duly qualified to act as Surety under the Act of Congress. And that to the best of her knowledge and belief the above statement is a full, true and correct statement of

Attest: Commonwealth of Pennsylvania - Notary Seal
Kimberly A. Kessleski, Notary Public
Montgomery County
My commission expires December 18, 2024
Commission number 1245769
Member, Pennsylvania Association of Notaries

Sworn to before me this 6th day of June 2023.

DocuSigned by:
Karen Gilmer-Panciello
Karen Gilmer-Panciello, EVP & CFO

Kimberly Kessleski
Kimberly Kessleski, Notary

PAYMENT BOND

Use for any contract for which a Payment Bond is required.

Bond No: PB01622700069

PAYMENT BOND (Page 1)

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

E&A Restoration Inc.

130 Crossways Park Drive, Suite 101

Woodbury, NY 11797

hereinafter referred to as the "Principal", and Philadelphia Indemnity Insurance Company

325 Columbia Turnpike

Florham Park, NJ 07932

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

Twenty Two Million Three Hundred Thousand Dollars & 19/100

(22,300,000.19) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for
85023B0022-SANDBOMB NYPD Bomb Squad Building

Development of a new Building for the NYPD Bomb Squad within the Rodman's Neck
complex, Bronx, NY

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns and other Subcontractors to whom Work under this Contract is sublet and his or their successors and assigns shall promptly pay or cause to be paid all lawful claims for

(a) Wages and compensation for labor performed and services rendered by all persons engaged in the prosecution of the Work under said Contract, and any amendment or extension thereof or addition thereto, whether such persons be agents servants or employees of the Principal or any such Subcontractor, including all persons so engaged who perform the work of laborers or mechanics at or in the vicinity of the site of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the project; and

PAYMENT BOND (Page 2)

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be void, otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

PAYMENT BOND (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this 14th day of November, 2023.

(Seal) E&A Restoration Inc. (L.S.) Principal
By: Jenny Sakalis
Jenny Sakalis, President

(Seal) Philadelphia Indemnity Insurance Company Surety
By: Patricia Von Posch
Patricia Von Posch, Attorney-in-Fact

(Seal) _____ Surety
By: _____

(Seal) _____ Surety
By: _____

(Seal) _____ Surety
By: _____

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Nassau ss:

On this 14 day of Nov., 2003, before me personally came Jenny Sakalis to me known, who, being by me duly sworn did depose and say that he resides at Syosset, NY that he is the President of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

[Signature]
Notary Public or Commissioner of Deeds

MANOLI KALAMOTOUSAKIS
NOTARY PUBLIC-STATE OF NEW YORK
No. 02KA6213500
Qualified in Queens County
My Commission Expires November 09, 2005

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

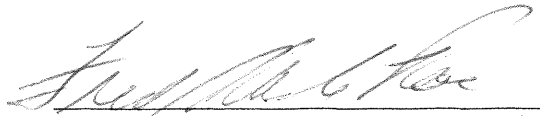
Affix Acknowledgments and Justification of Sureties.

ACKNOWLEDGMENT BY SURETY

STATE OF NEW YORK)
) ss.
County of NASSAU)

On this 14th day of November, 2023, before me personally appeared Patricia Von Posch, known to me to be the Attorney-in-Fact of Philadelphia Indemnity Insurance Company, the corporation that executed the within instrument, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, at my office in the aforesaid County, the day and year in this certificate first above written.



Notary Public in the State of New York
County of Nassau

FRED NASH ROE
Notary Public, State of New York
No. 01RO-4815494
Qualified in Nassau County
Commission Expires July 1, 2027

PHILADELPHIA INDEMNITY INSURANCE COMPANY
One Bala Plaza, Suite 100
Bala Cynwyd, PA 19004-0950

Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS: That PHILADELPHIA INDEMNITY INSURANCE COMPANY (the Company), a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, does hereby constitute and appoint John E. Roe Jr., Patricia Von Posch and Richard K. Kainz of Acrisure LLC, d/b/a City Underwriting Agency, its true and lawful Attorney-in-fact with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business and to bind the Company thereby, in an amount not to exceed \$50,000,000.

This Power of Attorney is granted and is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of PHILADELPHIA INDEMNITY INSURANCE COMPANY on the 14th of November, 2016.

RESOLVED: That the Board of Directors hereby authorizes the President or any Vice President of the Company: (1) Appoint Attorney(s) in Fact and authorize the Attorney(s) in Fact to execute on behalf of the Company bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof and to attach the seal of the Company thereto; and (2) to remove, at any time, any such Attorney-in-Fact and revoke the authority given. And, be it

FURTHER RESOLVED: That the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

IN TESTIMONY WHEREOF, PHILADELPHIA INDEMNITY INSURANCE COMPANY HAS CAUSED THIS INSTRUMENT TO BE SIGNED AND ITS CORPORATE SEAL TO BE AFFIXED BY ITS AUTHORIZED OFFICE THIS 5TH DAY OF MARCH, 2021.

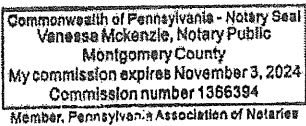


(Seal)

John Glomb, President & CEO
Philadelphia Indemnity Insurance Company

On this 5th day of March, 2021 before me came the individual who executed the preceding instrument, to me personally known, and being by me duly sworn said that he is the therein described and authorized officer of the PHILADELPHIA INDEMNITY INSURANCE COMPANY; that the seal affixed to said instrument is the Corporate seal of said Company; that the said Corporate Seal and his signature were duly affixed.

Notary Public:



residing at:

Bala Cynwyd, PA

My commission expires:

November 3, 2024

I, Edward Sayago, Corporate Secretary of PHILADELPHIA INDEMNITY INSURANCE COMPANY, do hereby certify that the foregoing resolution of the Board of Directors and the Power of Attorney issued pursuant thereto on the 5th day March, 2021 are true and correct and are still in full force and effect. I do further certify that John Glomb, who executed the Power of Attorney as President, was on the date of execution of the attached Power of Attorney the duly elected President of PHILADELPHIA INDEMNITY INSURANCE COMPANY.

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this 14th day of November, 2023



Edward Sayago, Corporate Secretary
PHILADELPHIA INDEMNITY INSURANCE COMPANY

PHILADELPHIA INDEMNITY INSURANCE COMPANY
Statutory Statements of Admitted Assets, Liabilities and Capital and Surplus
(in thousands, except par value and share amounts)

<u>Admitted Assets</u>	As of December 31,	
	<u>2022</u>	<u>2021</u>
Bonds (fair value \$7,902,637 and \$8,447,694)	\$ 8,709,823	\$ 8,102,442
Preferred stocks (fair value \$14,560 and \$19,262)	14,560	19,262
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Total admitted assets	<u>\$ 11,474,302</u>	<u>\$ 10,699,044</u>
<u>Liabilities and Capital and Surplus</u>		
<u>Liabilities:</u>		
Unpaid loss and loss adjustment expenses	\$ 5,680,508	\$ 5,436,808
Unearned premiums	1,766,050	1,658,339
Reinsurance payable on paid loss and loss adjustment expenses	39,160	35,820
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Total liabilities	<u>8,058,159</u>	<u>7,653,580</u>
<u>Capital:</u>		
Common stock, par value of \$10 per share; 1,000,000 shares authorized, 450,000 shares issued and outstanding	4,500	4,500
<u>Surplus:</u>		
Gross paid-in and contributed surplus	386,071	386,071
Unassigned surplus	<u>3,025,572</u>	<u>2,654,893</u>
Total surplus	<u>3,411,643</u>	<u>3,040,964</u>
Total capital and surplus	<u>3,416,143</u>	<u>3,045,464</u>
Total liabilities and capital and surplus	<u>\$ 11,474,302</u>	<u>\$ 10,699,044</u>

The undersigned, being duly sworn, says: That she is the Executive Vice President and Chief Financial Officer of Philadelphia Indemnity Insurance Company; that said Company is a corporation duly organized in the state of Pennsylvania, and licensed and engaged in the State of Pennsylvania and has duly complied with all the requirements of the laws of the said State applicable of the said Company and is duly qualified to act as Surety under such laws; that said Company has also complied with and is duly qualified to act as Surety under the Act of Congress. And that to the best of her knowledge and belief the above statement is a full, true and correct statement of

Attest:

Commonwealth of Pennsylvania - Notary Seal Kimberly A. Kessleski, Notary Public Montgomery County My commission expires December 18, 2024 Commission number 1245769 Member, Pennsylvania Association of Notaries

Sworn to before me this 6th day of June 2023.

DocuSigned by:



Karen Gilmer-Panciello, EVP & CFO



Kimberly Kessleski, Notary

**UNIFORM FEDERAL CONTRACT PROVISIONS RIDER
FOR FEDERALLY FUNDED PROCUREMENT CONTRACTS
(11/10/2015)**

[Instructions to Agencies: This Uniform Federal Contract Provisions Rider for Federally Funded Procurement Contracts (“Rider”) must be attached to all federally funded procurement contracts (of any dollar amount) that are subject to 2 CFR Part 200 (Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards). This Rider does not apply to subrecipient or subaward agreements. Procurement contracts funded by the U.S. Department of Housing and Urban Development CDBG Program or CDBG-DR Program must also include the CDBG or CDBG-DR Rider, as applicable.]

A. Definitions. As used in this Rider:

- (1) “Awarding Entity” means the entity awarding the Contract. The Awarding Entity may be the City or a contractor at any tier.
- (2) “City” means the City of New York.
- (3) “Commissioner” means the head of the City agency entering into this Contract.
- (4) “Construction” means the building, rehabilitation, alteration, conversion, extension, demolition, painting or repair of any improvement to real property.
- (5) “Contract” refers to the contract or the agreement between the Awarding Entity and the Contractor.
- (6) “Contractor” means the entity performing the services pursuant to a Contract.
- (7) “Federal Agency” means the U.S. agency or agencies funding this Contract in whole or in part.
- (8) “Government” means the U.S. government.
- (9) “Rider” means this Uniform Federal Contract Provisions Rider.

B. Termination and Remedies for Breach of Contract. The following provisions concerning remedies for breach of contract and termination apply to Contracts between the City and the City’s Contractor.

- (1) **Remedies for Breach of Contract.** If the Contractor violates or breaches the Contract, the City may avail itself of any or all of the remedies provided for elsewhere in this Contract. If there are no remedies provided for elsewhere in this Contract, the City may avail itself of any or all of the following remedies.

After declaring the Contractor in default pursuant to the procedures in paragraph (a) of subdivision (2) of this section (B) below, the City may (i) withhold payment for unsatisfactory services, (ii) suspend or terminate the Contract in whole or in part; and/or

(iii) have the services under this Contract completed by such means and in such manner, by contract procured with or without competition, or otherwise, as the City may deem advisable in accordance with all applicable Contract provisions and law. After completion of the services under this Contract, the City shall certify the expense incurred in such completion, which shall include the cost of procuring that contract. Should the expense of such completion, as certified by the City, exceed the total sum which would have been payable under the Contract if it had been completed by the Contractor, any excess shall be promptly paid by the Contractor upon demand by the City. The excess expense of such completion, including any and all related and incidental costs, as so certified by the City may be charged against and deducted out of monies earned by the Contractor.

(2) **Termination.** The City shall have the right to terminate the Contract in whole or in part for cause, for convenience, due to force majeure, or due to reductions in federal funding. If the Contract does not include termination provisions elsewhere, the following termination provisions apply:

a. **Termination for Cause.** The City shall have the right to terminate the Contract, in whole or in part, for cause upon a determination that the Contractor is in default of the Contract. Unless a shorter time is determined by the City to be necessary, the City shall effect termination according to the following procedure:

i. *Notice to Cure.* The City shall give written notice of the conditions of default signed by the Commissioner, setting forth the ground or grounds upon which such default is declared (“Notice to Cure”). The Contractor shall have ten (10) days from receipt of the Notice to Cure or any longer period that is set forth in the Notice to Cure to cure the default. The Commissioner may temporarily suspend services under the Contract pending the outcome of the default proceedings pursuant to this section.

ii. *Opportunity to be Heard.* If the conditions set forth in the Notice to Cure are not cured within the period set forth in the Notice to Cure, the Commissioner may declare the Contractor in default. Before the Commissioner may exercise his or her right to declare the Contractor in default, the Contractor must be given an opportunity to be heard upon not less than five (5) business days’ notice. The Commissioner may, in his or her discretion, provide for such opportunity to be in writing or in person. Such opportunity to be heard shall not occur prior to the end of the cure period but notice of such opportunity to be heard may be given prior to the end of the cure period and may be given contemporaneously with the Notice to Cure.

iii. *Notice of Termination.* After an opportunity to be heard, the Commissioner may terminate the Contract, in whole

or in part, upon finding the Contractor in default. The Commissioner shall give the Contractor written notice of such termination (“Notice of Termination”), specifying the applicable provision(s) under which the Contract is terminated and the effective date of termination. If no date is specified in the Notice of Termination, the termination shall be effective either 10 calendar days from the date the notice is personally delivered or 15 calendar days from the date Notice of Termination is sent by another method. The Notice of Termination shall be personally delivered, sent by certified mail return receipt requested, or sent by fax and deposited in a post office box regularly maintained by the United States Postal Service in a postage pre-paid envelope.

iv. *Grounds for Default.* The City shall have the right to declare the Contractor in default:

1. Upon a breach by the Contractor of a material term or condition of this Contract, including unsatisfactory performance of the services;

2. Upon insolvency or the commencement of any proceeding by or against the Contractor, either voluntarily or involuntarily, under the Bankruptcy Code or relating to the insolvency, receivership, liquidation, or composition of the Contractor for the benefit of creditors;

3. If the Contractor refuses or fails to proceed with the services under the Contract when and as directed by the Commissioner;

4. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities are indicted or convicted after execution of the Contract under any state or federal law of any of the following:

a. a criminal offense incident to obtaining or attempting to obtain or performing a public or private contract;

b. fraud, embezzlement, theft, bribery, forgery, falsification, or destruction of records, or receiving stolen property;

c. a criminal violation of any state or federal antitrust law;

d. violation of the Racketeer Influence and Corrupt Organization Act, 18 U.S.C. § 1961 et seq., or the Mail Fraud Act, 18

U.S.C. § 1341 et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

e. conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any statute described in subparagraph (d) above; or

f. an offense indicating a lack of business integrity that seriously and directly affects responsibility as a City vendor.

5. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities are subject to a judgment of civil liability under any state or federal antitrust law for acts or omissions in connection with the submission of bids or proposals for a public or private contract; or

6. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities makes or causes to be made any false, deceptive, or fraudulent material statement, or fail to make a required material statement in any bid, proposal, or application for City or other government work.

v. *Basis of Settlement.* The City shall not incur or pay any further obligation pursuant to this Contract beyond the termination date set by the City in its Notice of Termination. The City shall pay for satisfactory services provided in accordance with this Contract prior to the termination date. In addition, any obligation necessarily incurred by the Contractor on account of this Contract prior to receipt of notice of termination and falling due after the termination date shall be paid by the City in accordance with the terms of this Contract. In no event shall such obligation be construed as including any lease or other occupancy agreement, oral or written, entered into between the Contractor and its landlord.

b. **Termination for Convenience.** The City shall have the right to terminate the Contract for convenience, by providing written notice (“Notice of Termination”) according to the following procedure. The Notice of Termination shall specify the applicable provision(s) under which the Contract is terminated and the effective date of termination, which shall be not less than 10 calendar days from the date the notice is personally delivered or 15 days from the date the Notice of Termination is sent by another method. The Notice of Termination shall be personally

delivered, sent by certified mail return receipt requested, or sent by fax and deposited in a post office box regularly maintained by the United States Postal Service in a postage pre-paid envelope. The basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

c. Termination due to Force Majeure

- i. For purposes of this Contract, a force majeure event is an act or event beyond the control and without any fault or negligence of the Contractor (“Force Majeure Event”). Force Majeure Events may include, but are not limited to, fire, flood, earthquake, storm or other natural disaster, civil commotion, war, terrorism, riot, and labor disputes not brought about by any act or omission of the Contractor.
- ii. In the event the Contractor cannot comply with the terms of the Contract (including any failure by the Contractor to make progress in the performance of the services) because of a Force Majeure Event, then the Contractor may ask the Commissioner to excuse the nonperformance and/or terminate the Contract. If the Commissioner, in his or her reasonable discretion, determines that the Contractor cannot comply with the terms of the Contract because of a Force Majeure Event, then the Commissioner shall excuse the nonperformance and may terminate the Contract. Such a termination shall be deemed to be without cause.
- iii. If the City terminates the Contract due to a Force Majeure Event, the basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

d. Termination due to Reductions in Federal Funding

- i. This Contract is funded in whole or in part by funds secured from the Federal government. Should the Federal government reduce or discontinue such funds, the City shall have, in its sole discretion, the right to terminate this Contract in whole or in part, or to reduce the funding and/or level of services of this Contract caused by such action by the Federal government, including, in the case of the reduction option, but not limited to, the reduction or elimination of programs, services or service components; the reduction or elimination of contract-reimbursable staff or staff-hours, and corresponding reductions in the budget of this Contract and in the total amount payable under this Contract. Any reduction in funds pursuant to this

paragraph shall be accompanied by an appropriate reduction in the services performed under this Contract.

- ii. In the case of the reduction option referred to in subparagraph (i), above, any such reduction shall be effective as of the date set forth in a written notice thereof to the Contractor, which shall be not less than 30 calendar days from the date of such notice. Prior to sending such notice of reduction, the City shall advise the Contractor that such option is being exercised and afford the Contractor an opportunity to make within seven calendar days any suggestion(s) it may have as to which program(s), service(s), service component(s), staff or staff-hours might be reduced or eliminated, provided, however, that the City shall not be bound to utilize any of the Contractor's suggestions and that the City shall have sole discretion as to how to effectuate the reductions.
- iii. If the City reduces funding pursuant to this paragraph (c), the basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

C. Standard Provisions. The Contractor shall comply with, include in its subcontracts, and cause its subcontractors to comply with the following provisions, as applicable:

- (1) *Reporting.* Contractor shall be required to produce and deliver such reports relating to the services performed under the Contract as may be required by the Awarding Entity, City or any other State or Federal governmental agency with jurisdiction.
- (2) *Non-Discrimination.* Contractor shall not violate any Federal, State, or City law prohibiting discrimination concerning employment, the provision of services, and, if applicable, housing, funded by this Contract.
- (3) *Environmental Protection.* If the Contract is in excess of \$150,000, the Contractor shall comply with all applicable standards, orders, or regulations issued under the Clean Air Act (42 U.S.C. § 7401-7671q), Federal Water Pollution control Act (33 U.S.C. §§ 1251-1387) Section 508 of the Clean Water Act (33 U.S.C. § 1368), Executive Order 11738, and Environmental Protection Agency regulations (provisions of 40 CFR Part 50 and 2 CFR Part 1532 related to the Clean Air Act and Clean Water Act). Violations must be reported to the Federal Agency and the Regional Office of the Environmental Protection Agency (EPA). The Contractor shall include this provision in all subcontracts.
- (4) *Energy Efficiency.* The Contractor shall comply with mandatory standards and policies relating to energy efficiency that are contained in the New York State energy conservation plan issued in compliance with the Energy Policy Conservation Act (Pub. L. 94-163).
- (5) *Debarment.* The Contractor certifies that neither it nor its principals is currently in a state of debarment, suspension, or other ineligible status as a result of prior performance, failure, fraud, or violation of City laws. The Contractor further certifies that neither it nor

its principals is debarred, suspended, otherwise excluded from or ineligible for participation in Federal assistance programs. The City reserves the right to terminate this Contract if knowledge of debarment, suspension or other ineligibility has been withheld by the Contractor.

- (6) *Byrd Anti-Lobbying Amendment (31 USC §1352)*. Contractor certifies that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any Federal agency, a member of Congress, officer or employee of Congress, or any employee of a member of Congress in connection with obtaining this Contract. If the Contract is \$100,000 or more, the Contractor shall disclose to the City any lobbying with non-Federal funds that took place in connection with obtaining this Contract. Each lower tier subcontractor shall make such certification and forward any required disclosures from tier to tier up to the City as grant recipient. (Certification appears in Federal Appendix A)
- (7) *Solid Waste Disposal Act*. Pursuant to 2 CFR § 200.322, Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (codified at 42 USC § 6962). The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$ 10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$ 10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.
- (8) *Documentation of Costs*. All costs shall be supported by properly executed payrolls, time records, invoices, or vouchers, or other official documentation evidencing in proper detail the nature and propriety of the charges. All checks, payrolls, invoices, contracts, vouchers, orders or other accounting documents, pertaining in whole or in part to the Agreement, shall be clearly identified and regularly accessible.
- (9) *Records Retention*. The Contractor shall retain all books, documents, papers, and records relating to the services performed under the Contract for three years after final payment under the Contract is made and all other pending matters are closed.
- (10) *Records Access*. The Contractor shall grant access to the City, State or any other pass-through entity, the Federal Agency, Inspectors General, and/or the Comptroller General of the United States, or any of their duly authorized representatives, to any books, documents, papers, and/or records of the Contractor that are pertinent to the Contract for the purpose of making audits, examinations, excerpts, and transcripts. The right also includes timely and reasonable access to the Contractor's personnel for the purpose of interview and discussion related to such documents. The rights of access in this section are not limited to the required retention period but last as long as the records are retained.
- (11) *Small Firms, M/WBE Firms, and Labor Surplus Area Firms*. Contractor shall take the following affirmative steps in the letting of subcontracts, if subcontracts are to be let, in order to ensure that minority firms, women's business enterprises, and labor surplus area firms are used when possible:

- a. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- b. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- c. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
- d. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises; and
- e. Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

(12) *Intangible Property.*

- a. Pursuant to 2 CFR § 200.315(d), the Government reserves a royalty-free, non-exclusive, and irrevocable right to obtain, reproduce, publish, or otherwise use, and to authorize others to use, for Government purposes: (a) the copyright in any work developed under the Contract or subcontract; and (b) any rights of copyright to which a Contractor purchases ownership with grant support.
- b. Any reports, documents, data, photographs, deliverables, and/or other materials produced pursuant to the Contract ("Copyrightable Materials"), and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to the contract, shall upon their creation become the exclusive property of the City. The Copyrightable Materials shall be considered "work-made-for-hire" within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City shall be the copyright owner thereof and of all aspects, elements and components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as "work-made-for-hire," the Contractor hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Contractor shall retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials shall be used by the Contractor for no purpose other than in the performance of this Contract without the prior written

permission of the City. The City may grant the Contractor a license to use the Copyrightable Materials on such terms as determined by the City and set forth in the license.

- c. The Contractor acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Contractor shall fully cooperate in this effort, and agrees to provide any and all documentation necessary to accomplish this.
- d. The Contractor represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Contractor has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Contract, copies of which shall be provided to the City upon execution of this Contract.
- e. The Contractor shall promptly and fully report to the City any discovery or invention arising out of or developed in the course of performance of this Contract and the Contractor shall promptly and fully report to the Government to make a determination as to whether patent protection on such invention shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interest.
- f. If the Contractor publishes a work dealing with any aspect of performance under this Agreement, or with the results of such performance, the City shall have a royalty-free, non-exclusive irrevocable license to reproduce, publish, or otherwise use such work for City governmental purposes.

D. Special Provisions for Construction Contracts. If this Contract involves Construction work, design for Construction, or Construction services, all such work or services performed by the Contractor and its subcontractors shall be subject to the following requirements in addition to those set forth above in paragraphs (A), (B), and (C):

(1) *Federal Labor Standards.* The Contractor will comply with the following:

- a. The Davis-Bacon Act (40 U.S.C. §§ 3141-3148): If required by the federal program legislation, in Construction contracts involving an excess of \$2000, and subject to any other federal program limitations, all laborers and mechanics must be paid at a

rate not less than those determined by the Secretary of Labor to be prevailing for the City, which rates are to be provided by the City. These wage rates are a federally mandated minimum only, and will be superseded by any State or City requirement mandating higher wage rates. The Contractor also agrees to comply with Department of Labor Regulations pursuant to the Davis-Bacon Act found in 29 CFR Parts 1, 3, 5 and 7 which enforce statutory labor standards provisions.

- b. If required by the federal program legislation and subject to any other federal program limitations, Sections 103 and 107 of the Contract Work Hours and Safe Standards Act (40 U.S.C. §§ 3701-3708), which provides that no laborer or mechanic shall be required or permitted to work more than eight hours in a calendar day or in excess of forty hours in any workweek, unless such laborer or mechanic is paid at an overtime rate of 1½ times his/her basic rate of pay for all hours worked in excess of these limits, under any Construction contract costing in excess of \$2000. In the event of a violation of this provision, the Contractor shall not only be liable to any affected employee for his/her unpaid wages, but shall be additionally liable to the United States for liquidated damages.
- c. The Copeland “Anti-Kickback” Act (18 U.S.C. § 874), as supplemented by the regulations contained in 29 CFR Part 3, requiring that all laborers and mechanics shall be paid unconditionally and not less often than once a week, and prohibiting all but “permissible” salary deductions.
- d. If this Contract involves Construction work, design for Construction, or Construction services, a more complete detailed statement of Federal Labor Standards annexed hereto as FEDERAL EXHIBIT 2.

(2) *Equal Employment Opportunity*. Executive Order 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR chapter 60) for Construction contracts or subcontracts in excess of \$10,000. The Contractor shall include the notice found at FEDERAL EXHIBIT I in all Construction subcontracts. For the purposes of the Equal Opportunity Construction Contract Specifications and Clause below, the term “Construction Work” means the construction, rehabilitation, alteration, conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction .

Standard Federal Equal Employment Opportunity Construction Contract Specifications for Contracts and Subcontracts in Excess of \$10,000.

1. As used in these specifications:
 - a. “Covered area” means the geographical area described in the solicitation from which this Contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any Construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this Contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this Contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each Construction trade in which it has employees in the covered area. Covered Construction Contractors performing Construction Work in geographical areas where they do not have a Federal or federally assisted Construction contract shall apply the minority and female goals established for the geographical areas where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal

procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each Construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where Construction Work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of Construction Work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female Construction contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the Program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246 or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, Construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for hiring of local or other areas residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

- (3) (A) **Equal Opportunity Clause** (for contracts for Construction Work) required by 41 CFR Part 6-1.4(b). **[Effective through January 10, 2016]**

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

(B) **Equal Opportunity Clause** (for contracts for Construction Work) required by 41 CFR Part 6-1.4(b). **[Effective starting January 11, 2016]**

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation

conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.

(4) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

E. Rights to Inventions. [Special Provisions For Contracts Involving Experimental, Developmental, or Research Work.]

(1) If this Contract involves the performance of experimental, developmental, or research work by the Contractor or its subcontractors, and the entity performing such work is a Nonprofit Organization or Small Business Firm as defined below, the following provisions apply in addition to those set forth above in paragraphs (A), (B), and (C), unless the Contract specifically states that this provision is superseded:

a. Definitions. The following definitions apply to this section (D).

- i. "Invention" means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. § 2321 *et seq.*).
 - ii. "Subject invention" means any invention of the Contractor conceived or first actually reduced to practice in the performance of work under this Contract, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of Contract performance.
 - iii. "Practical Application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or government regulations, available to the public on reasonable terms.
 - iv. "Made" when used in relation to any invention means the conception or first actual reduction to practice of such invention.
 - v. "Small Business Firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in government procurement and subcontracting at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.
 - vi. "Nonprofit Organization" means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c) and exempt from taxation under section 501(a) of the Internal Revenue Code (25 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.
- b. *Allocation of Principal Rights.* The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to

practice or have practiced for or on behalf of the United States the subject invention throughout the world.

c. *Invention Disclosure, Election of Title and Filing of Patent Application by Contractor.*

- i. The Contractor will disclose each subject invention to the City and the Federal Agency within two months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. Such disclosure shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after such disclosure, the Contractor will promptly notify the City and the Federal Agency of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor.
- ii. The Contractor will elect in writing whether or not to retain title to any such invention by notifying the City and the Federal Agency within two years of disclosure to the City and the Federal Agency. However, in any case where publication, on sale or public use has initiated the one year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by the Federal Agency to a date that is no more than 60 days prior to the end of the statutory period.
- iii. The Contractor will file its initial patent application on a subject invention to which it elects to retain title within one year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The Contractor will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application or six months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign

patent applications where such filing has been prohibited by a Secrecy Order.

- iv. Requests for extension of the time for disclosure, election, and filing under subparagraphs (1), (2), and (3) may be granted at the discretion of the Federal Agency.

d. Conditions When the Government May Obtain Title

The Contractor will convey to the Federal Agency, upon written request, title to any subject invention --

- i. If the Contractor fails to disclose or elect title to the subject invention within the times specified in (c), above, or elects not to retain title; provided that the Federal Agency may only request title within 60 calendar days after learning of the failure of the Contractor to disclose or elect within the specified times.
 - ii. In those countries in which the Contractor fails to file patent applications within the times specified in (c) above; provided, however, that if the Contractor has filed a patent application in a country after the times specified in (c) above, but prior to its receipt of the written request of the Federal Agency, the Contractor shall continue to retain title in that country.
 - iii. In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.
- e. Minimum Rights to Contractor and Protection of the Contractor Right to File
- i. The Contractor will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Contractor fails to disclose the invention within the times specified in (c), above. The Contractor's license extends to its domestic subsidiary and affiliates, if any, within the corporate structure of which the Contractor is a party and includes the right to grant sublicenses of the same scope to the extent the Contractor was legally obligated to do so at the time the Contract was awarded. The license is transferable only with the approval of the Federal Agency except when transferred to the successor of that party of the Contractor's business to which the invention pertains.

- ii. The Contractor's domestic license may be revoked or modified by the funding Federal Agency to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR Part 404 and agency licensing regulations (if any). This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the funding Federal Agency to the extent the Contractor, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.
 - iii. Before revocation or modification of the license, the funding Federal Agency will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed thirty calendar days (or such other time as may be authorized by the funding Federal Agency for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal, in accordance with applicable regulations in 37 CFR Part 404 and Federal Agency regulations (if any) concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of the license.
- f. Contractor Action to Protect the Government's Interest
- i. The Contractor agrees to execute or to have executed and promptly deliver to the Federal Agency all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and (ii) convey title to the Federal Agency when requested under paragraph (d) above and to enable the Government to obtain patent protection throughout the world in that subject invention.
 - ii. The Contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Contractor each subject invention made under contract in order that the Contractor can comply with the disclosure provisions of paragraph (c), above, and to execute all papers necessary

to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by (c)(1), above. The Contractor shall instruct such employees through employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

- iii. The Contractor will notify the Federal Agency of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than thirty calendar days before the expiration of the response period required by the relevant patent office.
- iv. The Contractor agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with government support under (identify the contract) awarded by (identify the Federal Agency). The government has certain rights in the invention."

g. Subcontracts

- i. The Contractor will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the Contractor in this clause, and the Contractor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.
 - ii. The Contractor will include in all other subcontracts, regardless of tier, for experimental developmental or research work the patent rights clause required by 2 CFR § 200.315(c) and Appendix II to 2 CFR Part 200.
- h. *Reporting on Utilization of Subject Inventions.* The Contractor agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and such other data and information as the Federal

Agency may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by the Federal Agency in connection with any march-in proceeding undertaken by the Federal Agency in accordance with paragraph (j) of this clause. As required by 35 U.S.C. § 202(c)(5), the Federal Agency agrees it will not disclose such information to persons outside the Government without permission of the Contractor.

- i. *Preference for United States Industry.* Notwithstanding any other provision of this clause, the Contractor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject inventions in the United States unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by the Federal Agency upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.
- j. *March-in Rights.* The Contractor agrees that with respect to any subject invention in which it has acquired title, the Federal Agency has the right in accordance with the procedures in 37 CFR § 401.6 and any supplemental regulations of the Federal Agency to require the Contractor, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request the Federal Agency has the right to grant such a license itself if the Federal Agency determines that:
 - i. Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use.
 - ii. Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee or their licensees;
 - iii. Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee or licensees; or

- iv. Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.
- k. *Special Provisions for Contracts with Nonprofit Organizations.*
If the Contractor is a nonprofit organization, it agrees that:
- i. Rights to a subject invention in the United States may not be assigned without the approval of the Federal Agency, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the Contractor;
 - ii. The Contractor will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when the Federal Agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. § 202(e) and 37 CFR § 401.10;
 - iii. The balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific research or education; and
 - iv. It will make efforts that are reasonable under the circumstances to attract licensees of subject invention that are Small Business Firms and that it will give a preference to a Small Business Firm when licensing a subject invention if the Contractor determines that the Small Business Firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not Small Business Firms; provided, that the Contractor is also satisfied that the Small Business Firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Contractor. However, the Contractor agrees that the Secretary may review the Contractor's licensing program and decisions regarding Small Business Firm applicants, and the Contractor will negotiate changes to its licensing policies, procedures, or practices with the Secretary when the Secretary's review discloses that the Contractor could take reasonable steps

to implement more effectively the requirements of this paragraph (k)(iv).

1. *Communication.* The central point of contact at the Federal Agency for communications on matters relating to this clause may be obtained from the City upon request.

Certification Regarding Lobbying

The undersigned Contractor certifies, to the best of his or her knowledge, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor, _____ certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 et seq., apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Name and Title of Contractor's Authorized Official

Date

FEDERAL EXHIBIT 1

NOTICE TO BIDDERS

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246, as amended) FOR ALL CONSTRUCTION CONTRACTS AND SUB-CONTRACTS IN EXCESS OF \$10,000.

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all Construction Work in the covered area, are as follows:

Goals and Timetables for Minorities

<u>Trade</u>	<u>Goal</u> <u>(percent)</u>
Electricians	9.0 to 10.2
Carpenters	27.6 to 32.0
Steamfitters	12.2 to 13.5
Metal Lathers	24.6 to 25.6
Painters	28.6 to 26.0
Operating Engineers	25.6 to 26.0
Plumbers	12.0 to 14.5
Iron Workers (structural)	25.9 to 32.0
Elevator Constructors	5.5 to 6.5
Bricklayers	13.4 to 15.5
Asbestos Workers	22.8 to 28.0
Roofers	6.3 to 7.5
Iron Workers (ornamental)	22.4 to 23.0
Cement Masons	23.0 to 27.0
Glazers	16.0 to 20.0
Plasterers	15.8 to 18.0
Teamsters	22.0 to 22.5
Boilermakers	13.0 to 15.5
All Other	16.4 to 17.5

Goals and Timetables for Women

From April 1, 1980 until the present 6.9

These goals are applicable to all the Contractor's Construction Work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs Construction Work in a geographical area located outside of the covered area, it shall apply the goals established for such

geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved Construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any Construction subcontract in excess of \$10,000 at any tier for Construction Work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Contract, the "covered area" is the City of New York.

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**FEDERAL EMERGENCY MANAGEMENT AGENCY (“FEMA”) RIDER
(10/27/2015)**

**For use with contracts funded by the FEMA Grant and Cooperative Agreement Programs,
including the Public Assistance Program**

(This Rider should not be used with contracts funded by the following FEMA Programs: Emergency Management Preparedness Grant Program, Homeland Security Grant Program, Nonprofit Security Grant Program, Tribal Homeland Security Grant Program, Port Security Grant Program, and Transit Security Grant Program. This Rider should be accompanied by the Uniform Federal Contract Provisions Rider for Federally Funded Procurement Contracts.)

1. Suspension and Debarment. Section C(5) of the Uniform Federal Contract Provisions Rider for Federally Funded Procurement Contracts is supplemented with the following provisions:
 - (a) This contract is a covered transaction for purposes of 2 C.F.R. Parts 180 and 3000. As such the Contractor is required to verify that none of the Contractor, its principals (defined at 2 C.F.R. § 180.995), or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935). By entering into this contract, the Contractor certifies that it is in compliance with 2 C.F.R. Parts 180 and 3000.
 - (b) The Contractor must comply with 2 C.F.R. Part 180, subpart C and 2 C.F.R. Part 3000, subpart C during the term of this contract and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
 - (c) The certification in paragraph (a), above, and section C(5) of the Uniform Federal Contract Provisions Rider for Federally Funded Procurement Contracts is a material representation of fact relied upon by the City of New York. If it is later determined that the Contractor did not comply with 2 C.F.R. Part 180, subpart C and 2 C.F.R. Part 3000, subpart C, in addition to remedies available to the City of New York and, if applicable, the State of New York, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
2. Davis-Bacon Act. For the purposes of Section D(1)(a) of the Uniform Federal Contract Provisions Rider, compliance with the Davis-Bacon Act (40 U.S.C. §§ 3141-3148) is not required of the Contractor pursuant to FEMA regulations. However, if this Contract is funded by another federal funding source (e.g., the U.S. Department of Housing and Urban Development CDBG or CDBG-DR programs), compliance with the Davis-Bacon Act is required to the extent required by law and as set forth in the contract documents.
3. Rights to Inventions Made Under a Contract or Agreement. Section E of the Uniform Federal Contract Provisions Rider for Federally Funded Procurement Contracts does not

apply to the following FEMA Programs: Public Assistance Program, Hazard Mitigation Grant Program, Fire Management Assistance Grant Program, Crisis Counseling Assistance and Training Grant Program, Disaster Case Management Program, and Federal Assistance to Individuals and Households – Other Needs Assistance Grant Program.

4. Copeland “Anti-Kickback” Act. The Contractor shall comply with provisions of the Copeland “Anti-Kickback” Act (18 U.S.C. § 874) as delineated in the Uniform Federal Contract Provisions Rider, FEMA Exhibit 2, Section (A).
5. Contract Work Hours and Safety Standards Act. The Contractor shall comply with the provisions of the Contract Work Hours and Safety Standards Act as delineated in the Uniform Federal Contract Provisions Rider, FEMA Exhibit 2, Section (B).
6. Access to Records.
 - (a) The Contractor agrees to provide the City of New York, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
 - (b) The Contractor agrees to permit any of the foregoing parties to reproduce said documents by any means or to copy excerpts and transcriptions as reasonably needed.
 - (c) The Contractor agrees to provide the FEMA Administrator or his/her authorized representative access to construction or other work sites pertaining to the work being completed under the contract.
7. Logos. The Contractor shall not use DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.
8. Compliance with Law. The Contractor acknowledges that FEMA financial assistance will be used to fund the contract only and agrees to comply with all applicable federal law, regulations, executive orders, FEMA policies, procedures, and directives.
9. Federal Government not a Party. The Contractor acknowledges and understands that the Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the City, Contractor or any other party pertaining to any matter resulting from the contract.
10. False Claims. The Contractor acknowledges that 31 U.S.C. Chap. 38 applies to the Contractor’s actions pertaining to this contract.

EXHIBIT 2
Federal Labor Standards Provisions (Non-Davis Bacon)¹
Federal Emergency Management Agency
(10/27/2015)

Applicability: The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. Compliance with the Copeland “Anti-Kickback” Act.

1. **Contractor.** The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.
2. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clause in paragraph 1 above and such other clauses as the FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.
3. **Breach.** A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

B. Compliance with the Contract Work Hours and Safety Standards Act. The provisions of this Section B are applicable where the amount of the prime contract exceeds \$100,000.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1) of this Section B the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In

¹ This version of Exhibit 2 applies to contracts funded by FEMA Grant and Cooperative Agreement Programs, including the Public Assistance Program. Do not use this version of Exhibit 2 in connection with FEMA programs that are subject to the Davis-Bacon Act; such programs are the Emergency Management Preparedness Grant Program, the Homeland Security Grant Program, Nonprofit Security Grant Program, Tribal Homeland Security Grant Program, Port Security Grant Program, and Transit Security Grant Program.

addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

3. **Withholding for unpaid wages and liquidated damages.** The City of New York shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this Section B and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section B.

C. **Health and Safety.** The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

1. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
2. The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.
3. The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as FEMA or the Secretary of Labor shall direct as a means of enforcing such provisions.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

LABOR LAW ARTICLE 8 - NYC PUBLIC WORKS

Workers, Laborers and Mechanics employed on a public work project must receive not less than the prevailing rate of wage and benefits for the classification of work performed by each upon such public work. Pursuant to New York Labor Law Article 8 the Comptroller of the City of New York has promulgated this schedule solely for Workers, Laborers and Mechanics engaged by private contractors on New York City public work projects. Prevailing rates are required to be annexed to and form part of the public work contract pursuant to Labor Law section 220 (3).

This schedule is a compilation of separate determinations of the prevailing rate of wage and supplements made by the Comptroller for each trade classification listed herein pursuant to Labor Law section 220 (5). The source of the wage and supplement rates, whether a collective bargaining agreement, survey data or other, is listed at the end of each classification.

Agency Chief Contracting Officers should contact the Bureau of Labor Law's Classification Unit with any questions concerning trade classifications, prevailing rates or prevailing practices with respect to procurement on New York City public work contracts. Contractors are advised to review the Comptroller's Prevailing Wage Schedule before bidding on public work contracts. Contractors with questions concerning trade classifications, prevailing rates or prevailing practices with respect to public work contracts in the procurement stage must contact the contracting agency responsible for the procurement.

Any error as to compensation under the prevailing wage law or other information as to trade classification, made by the contracting agency in the contract documents or in any other communication, will not preclude a finding against the contractor of prevailing wage violation.

Any questions concerning trade classifications, prevailing rates or prevailing practices on New York City public work contracts that have already been awarded may be directed to the Bureau of Labor Law's Classification Unit by calling (212) 669-4443. All callers must have the agency name and contract registration number available when calling with questions on public work contracts. Please direct all other compliance issues to: laborlaw@comptroller.nyc.gov or Bureau of Labor Law, Attn: Paul Brumlik, Office of the Comptroller, 1 Centre Street, Room 651, New York, N.Y. 10007.

Pursuant to Labor Law § 220 (3-a) (a), the appropriate schedule of prevailing wages and benefits must be posted in a prominent and accessible place at all public work sites along with the Construction Poster provided on our web site at comptroller.nyc.gov/wages. In addition, covered employees must be given the appropriate schedule of prevailing wages and benefits along with the Worker Notice provided on our web site at the time the public work project begins, and with the first paycheck to each such employee after July first of each year.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site comptroller.nyc.gov/wages. Contractors must pay the wages and supplements in effect when the worker, laborer, mechanic performs the work. Preliminary schedules for future one-year periods appear in the City Record on or about June 1 each succeeding year. Final schedules appear on or about July 1 in the City Record and on our web site comptroller.nyc.gov/wages.

Prevailing rates and ratios for apprentices are published in the Construction Apprentice Prevailing Wage Schedule. Pursuant to Labor Law § 220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant, registered with the

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

New York State Department of Labor, may be paid at the apprentice rates. Apprentices who are not so registered must be paid as journey persons.

New York City public work projects awarded pursuant to a Project Labor Agreement (“PLA”) in accordance with Labor Law section 222 may have different labor standards for shift, premium and overtime work. Please refer to the PLA’s pre-negotiated labor agreements for wage and benefit rates applicable to work performed outside of the regular workday. More information is available at the Mayor’s Office of Contract Services (MOCS) web page at:

<https://www1.nyc.gov/site/mocs/legal-forms/project-labor-agreements.page>

All the provisions of Labor Law Article 8 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller in accordance with the trade classifications in this schedule; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project’s pre-negotiated labor agreement.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona fide fringe benefits which cost the employer no less than the prevailing supplemental benefits rate; or
- 2) Supplement the employee’s hourly wage by an amount no less than the prevailing supplemental benefits rate; or
- 3) Provide a combination of bona fide fringe benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Although prevailing wage laws do not require employers to provide bona fide fringe benefits (as opposed to wage supplements) to their employees, other laws may. For example, the Employee Retirement Income Security Act, 29 U.S.C. § 1001 et seq., the Patient Protection and Affordable Care Act, 42 U.S.C. § 18001 et seq., and the New York City Paid Sick Leave Law, N.Y.C. Admin. Code § 20-911 et seq., require certain employers to provide certain benefits to their employees. Labor agreements to which employers are a party may also require certain benefits. The Comptroller’s Office does not enforce these laws or agreements.

Employers must provide prevailing supplemental benefits at the straight time rate for each hour worked unless otherwise noted in the classification.

Paid Holidays, Vacation and Sick Leave when listed must be paid or provided in addition to the prevailing hourly supplemental benefit rate.

For more information, please refer to the Comptroller’s Prevailing Wage Law Regulations in Title 44 of the Rules of the City of New York, Chapter 2, available at comptroller.nyc.gov/wages.

Paul Brumlik
Director of Classifications
Bureau of Labor Law

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

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ASBESTOS HANDLER SEE HAZARDOUS MATERIAL HANDLER

BLASTER

Blaster

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$57.21**

Supplemental Benefit Rate per Hour: **\$50.43**

Blaster - Hydraulic Trac Drill

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$51.35**

Supplemental Benefit Rate per Hour: **\$50.43**

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$50.02**

Supplemental Benefit Rate per Hour: **\$50.43**

Blaster - Journeyperson

(Laborer, Chipper/Jackhammer including Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers and Hydro (Water) Demolition, Powder Carrier, Hydraulic Chuck Tender, Chuck Tender and Nipper)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.00**

Supplemental Benefit Rate per Hour: **\$50.43**

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.00**

Supplemental Benefit Rate per Hour: **\$50.43**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays

Labor Day
Thanksgiving Day

Shift Rates

When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

BOILERMAKER

Boilermaker

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$64.38**

Supplemental Benefit Rate per Hour: **\$47.35**

Supplemental Note: For time and one half overtime - \$70.58 For double overtime - \$93.80

Overtime Description

For Repair and Maintenance work:

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

For New Construction work:

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Quadruple time the regular rate for work on the following holiday(s).
Labor Day

Paid Holidays

Good Friday
Day after Thanksgiving
Day before Christmas
Day before New Year's Day

Shift Rates

On jobs requiring two (2) or three (3) shifts, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work eight (8) hours and receive eight hours at the regular straight time hourly rate plus two dollars (\$2.00) per hour. The third shift shall work eight (8) hours and receive eight hours at the regular straight time hourly rate plus two dollars and twenty-five cents (\$2.25) per hour.

(Local #5)

BRICKLAYER

Bricklayer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.23**

Supplemental Benefit Rate per Hour: **\$37.75**

Overtime Description

Time and one half the regular rate after a 7 hour day. If working on a job that is predominately Pointer, Cleaner, Caulker work, then Time and one half the regular rate after an 8 hour day.

Overtime

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates

The second shift wage rate shall be a 15% wage premium with no premium for supplemental benefits. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, eight hours will be paid at straight time rate for seven hours of work.

(Bricklayer District Council)

CARPENTER - BUILDING COMMERCIAL

Building Commercial

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$55.05**

Supplemental Benefit Rate per Hour: **\$47.83**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Shift Rates

The second shift will receive one hour at the double time rate of pay for the last hour of the shift; eight hours pay for seven hours of work, nine hours pay for eight hours of work. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

CARPENTER - HEAVY CONSTRUCTION WORK

(Construction of Engineered Structures and Building Foundations including all form work)

Heavy Construction Work

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.16**

Supplemental Benefit Rate per Hour: **\$54.26**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate and the supplemental benefits shall be paid at the straight time rate. When two (2) or more shifts of Carpenters are employed, single time will be paid for each shift.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS
(Excludes Engineered Structures and Building Foundations)

Carpenter High Rise A

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$50.78**

Supplemental Benefit Rate per Hour: **\$44.44**

Carpenter High Rise B

Carpenter High Rise B worker is excluded from high risk operations such as erection decking, perimeter debris netting, leading edge work, self-climbing form systems, and the installation of cocoon systems unless directly supervised by a Carpenter High Rise A worker.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$40.19**

Supplemental Benefit Rate per Hour: **\$17.75**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Shift Rates

The second shift wage rate shall be 113% of the straight time hourly wage rate. However, any shift beginning after 5:00 P.M. shall be paid at time and one half the regular hourly rate. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

CARPENTER - SIDEWALK SHED, SCAFFOLD AND HOIST

Carpenter - Hod Hoist

(Assisted by Mason Tender)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$53.00**

Supplemental Benefit Rate per Hour: **\$47.65**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

The second shift will receive 112% of the straight time hourly rate. Benefit fund contributions shall be paid at the straight time rate. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

(Carpenters District Council)

CARPENTER - WOOD WATER STORAGE TANK

Tank Mechanic

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$36.42**

Supplemental Benefit Rate per Hour: **\$23.10**

Tank Helper

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$28.76**

Supplemental Benefit Rate per Hour: **\$23.10**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

1/2 day on Christmas Eve if work is performed in the A.M.

Christmas Day

1/2 day on New Year's Eve if work is performed in the A.M.

Vacation

Employed for one (1) year.....one (1) week vacation (40 hours)

Employed for three (3) years.....two (2) weeks vacation (80 hours)

Employed for more than twenty (20) years.....three (3) weeks vacation (120 hours)

SICK LEAVE:

Two (2) sick days after being employed for twenty (20) years.

(Carpenters District Council)

CEMENT & CONCRETE WORKER

Cement & Concrete Worker

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.28**

Supplemental Benefit Rate per Hour: **\$30.20**

Supplemental Note: \$34.20 on Saturdays; \$38.20 on Sundays & Holidays

Cement & Concrete Worker - (Hired after 2/6/2016)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$35.80**

Supplemental Benefit Rate per Hour: **\$22.20**

Supplemental Note: \$24.20 on Saturdays; \$26.20 on Sundays & Holidays

Overtime Description

Time and one half the regular rate after 7 hour day (time and one half the regular rate after an 8 hour day when working with Dockbuilders on pile cap forms and for work below street level to the top of the foundation wall, not to exceed 2 feet or 3 feet above the sidewalk-brick shelf, when working on the foundation and structure.)

Overtime

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

1/2 day before Christmas Day

1/2 day before New Year's Day

Shift Rates

On shift work extending over a twenty-four hour period, all shifts are paid at straight time.

(Cement & Concrete Workers District Council 16)

CEMENT MASON

Cement Mason

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.77**

Supplemental Benefit Rate per Hour: **\$41.01**

Supplemental Note: Supplemental benefit time and one half rate: \$71.97; Double time rate: double the base supplemental benefit rate.

Overtime Description

Time and one-half the regular rate after an 8 hour day, double time the regular rate after 10 hours. Time and one-half the regular rate on Saturday, double time the regular rate after 10 hours. Double time the regular rate on Sunday. Four Days a week at Ten (10) hours straight time is allowed.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

Shift Rates

For off shift work, (at times other than the regular 7:00 A.M. to 3:30 P.M. work day) a cement mason shall be paid at the regular hourly rate plus a 25% per hour differential.

(Local #780) (BCA)

CORE DRILLER

Core Driller

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 10/17/2022

Wage Rate per Hour: **\$42.54**

Supplemental Benefit Rate per Hour: **\$30.60**

Effective Period: 10/18/2022 - 6/30/2023

Wage Rate per Hour: **\$43.88**

Supplemental Benefit Rate per Hour: **\$31.35**

Core Driller Helper

Effective Period: 7/1/2022 - 10/17/2022

Wage Rate per Hour: **\$33.47**

Supplemental Benefit Rate per Hour: **\$30.60**

Effective Period: 10/18/2022 - 6/30/2023

Wage Rate per Hour: **\$34.47**

Supplemental Benefit Rate per Hour: **\$31.35**

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2022 - 10/17/2022

Wage Rate per Hour: **\$30.12**

Supplemental Benefit Rate per Hour: **\$30.60**

Effective Period: 10/18/2022 - 6/30/2023

Wage Rate per Hour: **\$31.02**

Supplemental Benefit Rate per Hour: **\$31.35**

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2022 - 10/17/2022

Wage Rate per Hour: **\$26.78**

Supplemental Benefit Rate per Hour: **\$30.60**

Effective Period: 10/18/2022 - 6/30/2023

Wage Rate per Hour: **\$27.58**

Supplemental Benefit Rate per Hour: **\$31.35**

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2022 - 10/17/2022

Wage Rate per Hour: **\$23.43**

Supplemental Benefit Rate per Hour: **\$30.60**

Effective Period: 10/18/2022 - 6/30/2023

Wage Rate per Hour: **\$24.13**

Supplemental Benefit Rate per Hour: **\$31.35**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime Description

Time and one half the regular rate for work on a holiday plus Holiday pay when worked.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Shift Rates

When two (2) or more shifts are employed, single time shall be paid for each shift, but those employees employed on a shift other than from 8:00 A.M. to 5:00 P.M. shall, in addition, receive two dollars (\$2.00) per hour differential for each hour worked. When three (3) shifts are needed, each shift shall work seven and one-half (7 ½) hours paid for eight (8) hours of labor and be permitted one-half (½) hour for mealtime.

(Carpenters District Council)

DERRICKPERSON AND RIGGER

Derrick Person & Rigger

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: \$57.76

Supplemental Benefit Rate per Hour: \$56.24

Derrick Person & Rigger - Site Work

Assists the Stone Mason-Setter in the setting of stone and paving stone.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: \$46.20

Supplemental Benefit Rate per Hour: \$44.97

Overtime Description

The first two hours of overtime on weekdays and the first seven hours of work on Saturdays are paid at time and one half for wages and supplemental benefits. All additional overtimes is paid at double time for wages and supplemental benefits.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
Washington's Birthday
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

(Local #197)

DIVER

Diver (Marine)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$73.03**

Supplemental Benefit Rate per Hour: **\$54.26**

Diver Tender (Marine)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$52.57**

Supplemental Benefit Rate per Hour: **\$54.26**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates

When three shifts are utilized each shift shall work seven and one half-hours (7 1/2 hours) and paid for 8 hours, allowing for one half hour for lunch.

(Carpenters District Council)

DOCKBUILDER - PILE DRIVER

Dockbuilder - Pile Driver

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.16**

Supplemental Benefit Rate per Hour: **\$54.26**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates

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Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Dump Truck

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.17**

Supplemental Benefit Rate per Hour: **\$53.95**

Supplemental Note: Over 40 hours worked: at time and one half rate - \$24.00; at double time rate - \$32.00

Driver - Tractor Trailer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.32**

Supplemental Benefit Rate per Hour: **\$52.40**

Supplemental Note: Over 40 hours worked: at time and one half rate - \$23.25; at double time rate - \$31.00

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.88**

Supplemental Benefit Rate per Hour: **\$52.40**

Supplemental Note: Over 40 hours worked: at time and one half rate - \$23.25; at double time rate - \$31.00

Overtime Description

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Off shift work commencing between 6:00 P.M. and 4:30 A.M. shall work eight and one half (8 1/2) hours allowing for one half hour for lunch and receive 9 hours pay for 8 hours of work.

Driver Redi-Mix (Sand & Gravel)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$40.89**

Supplemental Benefit Rate per Hour: **\$47.85**

Supplemental Note: Over 40 hours worked: time and one half rate \$18.68; double time rate \$24.90

Overtime Description

For Paid Holidays: Employees who do not work on a contractual holiday shall be compensated two (2) hours extra pay in straight time wages and benefits for every day on which the Employee does not pass up a day's work during the calendar week (Sunday through Saturday) of the holiday, up to a maximum of ten (10) hours in wages and eight (8) hours in benefit contributions for the holiday

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

President's Day
Columbus Day
Veteran's Day

Triple time the regular rate for work on the following holiday(s).

New Year's Day
Memorial Day
Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Christmas Day

(Local #282)

ELECTRICIAN

(Including installation of low voltage cabling carrying data, video and/or voice on building construction/alteration/renovation projects.)

Electrician "A" (Regular Day / Day Shift)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$59.00**

Supplemental Benefit Rate per Hour: **\$57.84**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$61.00**

Supplemental Benefit Rate per Hour: **\$60.06**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician "A" (Regular Day Overtime after 7 hrs / Day Shift Overtime after 8 hrs)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$88.50**

Supplemental Benefit Rate per Hour: **\$59.74**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$91.50**

Supplemental Benefit Rate per Hour: **\$62.02**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Electrician "A" (Swing Shift)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$69.23**

Supplemental Benefit Rate per Hour: **\$65.68**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$71.57**

Supplemental Benefit Rate per Hour: **\$68.14**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician "A" (Swing Shift Overtime after 7.5 hours)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$103.85**

Supplemental Benefit Rate per Hour: **\$67.90**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$107.36**

Supplemental Benefit Rate per Hour: **\$70.45**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$77.54**

Supplemental Benefit Rate per Hour: **\$72.31**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$80.17**

Supplemental Benefit Rate per Hour: **\$74.99**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician "A" (Graveyard Shift Overtime after 7 hours)

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$116.31**

Supplemental Benefit Rate per Hour: **\$74.80**

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$120.26**

Supplemental Benefit Rate per Hour: **\$77.57**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

* Supplemental Benefit Rate per Hour Note

In addition to the Supplemental Benefit Rates per Hour listed above, the employer must provide an additional 6.2% of taxable gross pay earned on covered work only. This additional Supplemental Benefit Rate will terminate

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

when the employee has contributed the maximum annual Social Security tax required by law, on all work performed.

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on a holiday.

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

For multiple shifts of temporary light and/or power, the temporary light and/or power employee shall be paid for 8 hours at the straight time rate. For three or less workers performing 8 hours temporary light and/or power the supplemental benefit rate is \$24.36, effective 04/13/2023 the supplemental benefit rate is \$24.78 - See * Supplemental Benefit Rate per Hour Note above.

Electrician "M" (First 8 hours)

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$31.25**

Supplemental Benefit Rate per Hour: **\$25.30**

First and Second Year "M" Wage Rate Per Hour: **\$26.75**

First and Second Year "M" Supplemental Rate: **\$22.88**

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$31.25**

Supplemental Benefit Rate per Hour: **\$26.55**

First and Second Year "M" Wage Rate Per Hour: **\$26.75**

First and Second Year "M" Supplemental Rate: **\$24.13**

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Electrician "M" (Overtime After First 8 hours)

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2022 - 4/12/2023

Wage Rate per Hour: **\$46.88**

Supplemental Benefit Rate per Hour: **\$27.28**

First and Second Year "M" Wage Rate Per Hour: **\$40.13**

First and Second Year "M" Supplemental Rate: **\$24.57**

Effective Period: 4/13/2023 - 6/30/2023

Wage Rate per Hour: **\$46.88**

Supplemental Benefit Rate per Hour: **\$28.53**

First and Second Year "M" Wage Rate Per Hour: **\$40.13**

First and Second Year "M" Supplemental Rate: **\$25.82**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

(Local #3)

ELECTRICIAN - ALARM TECHNICIAN

(Scope of Work - Inspect, test, repair, and replace defective, malfunctioning, or broken devices, components and controls of Fire, Burglar and Security Systems)

Alarm Technician

Effective Period: 7/1/2022 - 3/8/2023

Wage Rate per Hour: **\$35.40**

Supplemental Benefit Rate per Hour: **\$19.79**

Supplemental Note: \$17.91 only after 8 hours worked in a day

Effective Period: 3/9/2023 - 6/30/2023

Wage Rate per Hour: **\$36.40**

Supplemental Benefit Rate per Hour: **\$20.67**

Supplemental Note: \$18.80 only after 8 hours worked in a day

Overtime Description

Time and one half the regular rate for work on the following holidays: Columbus Day, Veterans Day, Day after Thanksgiving.

Double time the regular rate for work on the following holidays: New Year's day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Shift Rates

Night Differential is based upon a ten percent (10%) differential between the hours of 4:00 P.M. and 12:30 A.M. and a fifteen percent (15%) differential for the hours 12:00 A.M. to 8:30 A.M.

Vacation

At least 1 year of employment.....ten (10) days

5 years or more of employment.....fifteen (15) days

10 years of employment.....twenty (20) days

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Plus one Personal Day per year

Sick Days:

One day per Year. Up to 4 vacation days may be used as sick days.

(Local #3)

ELECTRICIAN-STREET LIGHTING WORKER

Electrician - Electro Pole Electrician

Effective Period: 7/1/2022 - 4/19/2023

Wage Rate per Hour: **\$59.00**

Supplemental Benefit Rate per Hour: **\$59.85**

Effective Period: 4/20/2023 - 6/30/2023

Wage Rate per Hour: **\$61.00**

Supplemental Benefit Rate per Hour: **\$62.13**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2022 - 4/18/2023

Wage Rate per Hour: **\$44.66**

Supplemental Benefit Rate per Hour: **\$45.27**

Effective Period: 4/20/2023 - 6/30/2023

Wage Rate per Hour: **\$46.66**

Supplemental Benefit Rate per Hour: **\$47.16**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

Electrician - Electro Pole Maintainer

Effective Period: 7/1/2022 - 4/18/2023

Wage Rate per Hour: **\$38.61**

Supplemental Benefit Rate per Hour: **\$41.00**

Effective Period: 4/20/2023 - 6/30/2023

Wage Rate per Hour: **\$40.61**

Supplemental Benefit Rate per Hour: **\$42.88**

* Supplemental Note: See Supplemental Benefit Rate per Hour Note below

* Supplemental Benefit Rate per Hour Note

In addition to the Supplemental Benefit Rates per Hour listed above, the employer must provide an additional 6.2% of taxable gross pay earned on covered work only. This additional Supplemental Benefit Rate will terminate when the employee has contributed the maximum annual Social Security tax required by law, on all work performed.

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Overtime Description

Electrician - Electro Pole Electrician: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week.

Electrician - Electro Pole Foundation Installer: Time and one half the regular rate after 8 hours within a 24 hour period and Saturday and Sunday.

Electrician - Electro Pole Maintainer: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week. Saturdays and Sundays may be used as a make-up day at straight time when a day is lost during the week to inclement weather.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

(Local #3)

ELEVATOR CONSTRUCTOR

Elevator Constructor

Effective Period: 7/1/2022 - 3/16/2023

Wage Rate per Hour: **\$75.14**

Supplemental Benefit Rate per Hour: **\$39.11**

Effective Period: 3/17/2023 - 6/30/2023

Wage Rate per Hour: **\$77.49**

Supplemental Benefit Rate per Hour: **\$40.62**

Overtime Description

For New Construction: work performed after an 8 hour day, Saturday, Sunday or between 4:30pm and 7:00am shall be paid at double time rate.

Existing buildings: work performed after an 8 hour day, Saturday, Sunday or between 5:30pm and 7:00 am shall be paid time and one half.

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Overtime

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ELEVATOR REPAIR & MAINTENANCE

Elevator Service/Modernization Mechanic

Effective Period: 7/1/2022 - 3/16/2023

Wage Rate per Hour: **\$59.09**

Supplemental Benefit Rate per Hour: **\$39.01**

Effective Period: 3/17/2023 - 6/30/2023

Wage Rate per Hour: **\$60.89**

Supplemental Benefit Rate per Hour: **\$40.52**

Overtime Description

For Scheduled Service Work: Double time - work scheduled in advance by two or more workers performed on Sundays, Holidays, and between midnight and 7:00am.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Afternoon shift - regularly hourly rate plus a (15%) fifteen percent differential. Graveyard shift - time and one half the regular rate.

Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ENGINEER

Engineer - Heavy Construction Operating Engineer I

Cherry pickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$74.86**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$119.78**

Engineer - Heavy Construction Operating Engineer II

Backhoes, Basin Machines, Groover, Mechanical Sweepers, Bobcat, Boom Truck, Barrier Transport (Barrier Mover) & machines of similar nature. Operation of Churn Drills and machines of a similar nature, Stetco Silent Hoist and machines of similar nature, Vac-Alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherry pickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar

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nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$72.55**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$116.08**

Engineer - Heavy Construction Operating Engineer III

Minor Equipment such as Tractors, Post Hole Diggers, Ditch Witch (Walk Behind), Road Finishing Machines, Rollers five tons and under, Tugger Hoists, Dual Purpose Trucks, Fork Lifts, and Dempsey Dumpers, Fireperson.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$68.68**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$109.89**

Engineer - Heavy Construction Maintenance Engineer I

Installing, Repairing, Maintaining, Dismantling and Manning of all equipment including Steel Cutting, Bending and Heat Sealing Machines, Mechanical Heaters, Grout Pumps, Bentonite Pumps & Plants, Screening Machines, Fusion Coupling Machines, Tunnel Boring Machines Moles and Machines of a similar nature, Power Packs, Mechanical Hydraulic Jacks; all drill rigs including but not limited to Churn, Rotary Caisson, Raised Bore & Drills of a similar nature; Personnel, Inspection & Safety Boats or any boats used to perform functions of same, Mine Hoists, Whirlies, all Climbing Cranes, all Tower Cranes, including but not limited to Truck Mounted and Crawler Type and machines of similar nature; Maintaining Hydraulic Drills and machines of a similar nature; Well Point System-Installation and dismantling; Burning, Welding, all Pumps regardless of size and/or motor power, except River Cofferdam Pumps and Wells Point Pumps; Motorized Buggies (three or more); equipment used in the cleaning and televising of sewers, but not limited to jet-rodder/vacuum truck, vacall/vactor, closed circuit television inspection equipment; high powered water pumps, jet pumps; screed machines and concrete finishing machines of a similar nature; vermeers.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$72.19**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$115.50**

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$95.74**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$153.18**

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.62**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$74.59**

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.90**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$76.64**

Engineer - Heavy Construction Service Engineer

Gradalls: Concrete Pumps: Power Houses: Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$64.78**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$103.65**

Engineer - Heavy Construction Service Mechanic

Shovels: Cranes: Draglines: Backhoes: Keystones: Pavers: Trenching Machines: Gunite Machines: Compressors (three (3) or more in Battery): Crawler Cranes- having a straight lattice boom with no attachment or luffing boom, no jib and no auxiliary attachment.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$43.90**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$70.24**

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$69.19**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

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Shift Wage Rate: **\$110.70**

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$64.57**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$103.31**

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$48.44**

Supplemental Benefit Rate per Hour: **\$44.72**

Supplemental Note: \$82.04 on overtime

Shift Wage Rate: **\$77.50**

Overtime Description

On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Engineer - Building Work Maintenance Engineers I

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Installing, repairing, maintaining, dismantling (of all equipment including: Steel Cutting and Bending Machines, Mechanical Heaters, Mine Hoists, Climbing Cranes, Tower Cranes, Linden Peine, Lorain, Liebherr, Mannes, or machines of a similar nature, Well Point Systems, Deep Well Pumps, Concrete Mixers with loading Device, Concrete Plants, Motor Generators when used for temporary power and lights), skid steer machines of a similar nature including bobcat.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$64.47**

Supplemental Benefit Rate per Hour: **\$43.81**

Supplemental Note: \$80.22 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$49.42**

Supplemental Benefit Rate per Hour: **\$43.81**

Supplemental Note: \$80.22 on overtime

Engineer - Building Work Oilers I

All gasoline, electric, diesel or air operated Gradealls: Concrete Pumps, Overhead Cranes in Power Houses: Their duties shall be to assist the Engineer in oiling, greasing and repairing of all machines; Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks, Cherrypickers (hydraulic cranes) over 70,000 GVW, and machines of a similar nature.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$61.15**

Supplemental Benefit Rate per Hour: **\$43.81**

Supplemental Note: \$80.22 on overtime

Engineer - Building Work Oilers II

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Guniting Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.68**

Supplemental Benefit Rate per Hour: **\$43.81**

Supplemental Note: \$80.22 on overtime

Overtime Description

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates

When two (2) or more shifts are employed, single time will be paid for each shift.

(Local #15)

ENGINEER - CITY SURVEYOR AND CONSULTANT

Party Chief

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$42.49**

Supplemental Benefit Rate per Hour: **\$25.50**

Supplemental Note: Overtime Benefit Rate - \$30.50 per hour (time & one half) \$35.50 per hour (double time).

Instrument Person

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$34.64**

Supplemental Benefit Rate per Hour: **\$25.50**

Supplemental Note: Overtime Benefit Rate - \$30.50 per hour (time & one half) \$35.50 per hour (double time).

Rodperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$29.69**

Supplemental Benefit Rate per Hour: **\$25.50**

Supplemental Note: Overtime Benefit Rate - \$30.50 per hour (time & one half) \$35.50 per hour (double time).

Overtime Description

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays

- New Year's Day
- Lincoln's Birthday
- President's Day
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Veteran's Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (BUILDING CONSTRUCTION) (Construction of Building Projects, Concrete Superstructures, etc.)

Field Engineer - BC Party Chief

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$66.46**

Supplemental Benefit Rate per Hour: **\$40.09**

Supplemental Note: Overtime Benefit Rate - \$56.54 per hour (time & one half) \$72.98 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$50.97**

Supplemental Benefit Rate per Hour: **\$40.09**

Supplemental Note: Overtime Benefit Rate - \$56.54 per hour (time & one half) \$72.98 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.90**

Supplemental Benefit Rate per Hour: **\$40.09**

Supplemental Note: Overtime Benefit Rate - \$56.54 per hour (time & one half) \$72.98 per hour (double time).

Overtime Description

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate after a 7 hour work and time and one half the regular rate for Saturday for the first seven hours worked, Double time the regular time rate for Saturday for work performed in excess of seven hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (HEAVY CONSTRUCTION) (Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations, Engineering Structures etc.)

Field Engineer - HC Party Chief

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$77.31**

Supplemental Benefit Rate per Hour: **\$42.52**

Supplemental Note: Overtime benefit rate - \$60.06 per hour (time & one half), \$77.60 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$55.97**

Supplemental Benefit Rate per Hour: **\$42.52**

Supplemental Note: Overtime benefit rate - \$60.06 per hour (time & one half), \$77.60 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.47**

Supplemental Benefit Rate per Hour: **\$42.52**

Supplemental Note: Overtime benefit rate - \$60.06 per hour (time & one half), \$77.60 per hour (double time).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime Description

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays

New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (STEEL ERECTION)

Field Engineer - Steel Erection Party Chief

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$71.98**

Supplemental Benefit Rate per Hour: **\$42.07**

Supplemental Note: Overtime benefit rate - \$59.38 per hour (time & one half), \$76.69 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$55.42**

Supplemental Benefit Rate per Hour: **\$42.07**

Supplemental Note: Overtime benefit rate - \$59.38 per hour (time & one half), \$76.69 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$36.05**

Supplemental Benefit Rate per Hour: **\$42.07**

Supplemental Note: Overtime benefit rate - \$59.38 per hour (time & one half), \$76.69 per hour (double time).

Overtime Description

Time and one half the regular rate for Saturday for the first eight hours worked.
Double time the regular rate for Saturday for work performed in excess of eight hours.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - OPERATING

Operating Engineer - Road & Heavy Construction I

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$88.32**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$141.31**

Operating Engineer - Road & Heavy Construction II

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$91.40**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$146.24**

Operating Engineer - Road & Heavy Construction III

Mine Hoists (Cranes, etc. when used as Mine Hoists)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$94.31**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$150.90**

Operating Engineer - Road & Heavy Construction IV

Gradealls, Keystones, Cranes on land or water (with digging buckets), Bridge Cranes, Vermeer Cutter and machines of a similar nature, Trenching Machines.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$92.06**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$147.30**

Operating Engineer - Road & Heavy Construction V

Pile Drivers & Rigs (working alongside Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$90.26**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$144.42**

Operating Engineer - Road & Heavy Construction VI

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$85.80**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$137.28**

Operating Engineer - Road & Heavy Construction VII

Barrier Movers, Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$69.52**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$111.23**

Operating Engineer - Road & Heavy Construction VIII

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Utility Compressors

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$54.21**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$68.04**

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$81.67**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$130.67**

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$75.16**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$120.26**

Operating Engineer - Road & Heavy Construction XI

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.61**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$93.78**

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$86.71**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: \$64.40 overtime hours

Shift Wage Rate: **\$138.74**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Operating Engineer - Road & Heavy Construction XIII

Concrete Pumps, Concrete Plant, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$84.02**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Shift Wage Rate: **\$134.43**

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$80.36**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Shift Wage Rate: **\$128.58**

Operating Engineer - Road & Heavy Construction XV

Compressors (Portable Single or two in Battery, not over 100 feet apart), Pumps (River Cofferdam) and Welding Machines, Push Button Machines, All Engines Irrespective of Power (Power-Pac) used to drive auxiliary equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$54.56**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Shift Wage Rate: **\$87.30**

Operating Engineer - Road & Heavy Construction XVI

Concrete Breaking Machines, Hoists (Single Drum), Load Masters, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$76.80**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Shift Wage Rate: **\$122.88**

Operating Engineer - Road & Heavy Construction XVII

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$77.36**

Supplemental Benefit Rate per Hour: **\$35.30**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: \$123.78

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$110.56
Supplemental Benefit Rate per Hour: \$35.30
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: \$176.90

Operating Engineer - Paving I

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$85.80
Supplemental Benefit Rate per Hour: \$35.30
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: \$137.28

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$83.63
Supplemental Benefit Rate per Hour: \$35.30
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: \$133.81

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$70.88
Supplemental Benefit Rate per Hour: \$35.30
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: \$113.41

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$91.66

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$54.97**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours

Operating Engineer - Concrete III

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$73.46**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$95.02**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$152.03**

Operating Engineer - Steel Erection II

Cranes, 2 Drum Derricks, Hydraulic Cranes, Fork Lifts and Boom Trucks.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$91.33**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$146.13**

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$54.68**
Supplemental Benefit Rate per Hour: **\$35.30**
Supplemental Note: \$64.40 overtime hours
Shift Wage Rate: **\$87.49**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine. (Public Works Only)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$52.10**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Shift Wage Rate: **\$83.36**

Operating Engineer - Building Work I

Forklifts, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$73.28**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, Jacking System, etc.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$54.94**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$86.78**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$91.86**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$81.38**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$80.52**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$64.09**

Supplemental Benefit Rate per Hour: **\$35.30**

Supplemental Note: **\$64.40** overtime hours

For New House Car projects Wage Rate per Hour **\$51.21**

For New House Car projects: Supplemental Benefit overtime hours: **\$49.85**

Overtime Description

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

For House Cars and Rack & Pinion only: Overtime paid at time and one-half for all hours in excess of eight hours in a day, Saturday, Sunday and Holidays worked.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Thanksgiving Day
Day after Thanksgiving
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates

When two (2) or more shifts are employed, single time will be paid for each shift.

For Steel Erection Only: Shifts may be worked at the single time rate at other than the regular working hours (8:00 A.M. to 4:30 P.M.) on the following work ONLY: Heavy construction jobs on work below the street level, over railroad tracks and on building jobs.

(Operating Engineer Local #14)

FLOOR COVERER

(Interior vinyl composition tile, sheath vinyl linoleum and wood parquet tile including site preparation and synthetic turf not including site preparation)

Floor Coverer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$55.05**

Supplemental Benefit Rate per Hour: **\$47.83**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Day before Christmas

Christmas Day

Day before New Year's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Shift Rates

Two shifts may be utilized with the first shift working 8 a.m. to the end of the shift at straight time rate of pay. The wage rate for the second shift consisting of 7 hours shall be paid at 114.29% of straight time wage rate. The wage rate for the second shift consisting of 8 hours shall be paid 112.5% of the straight time wage rate. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

GLAZIER

(New Construction, Remodeling, and Alteration)

Glazier

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.55**

Supplemental Benefit Rate per Hour: **\$50.04**

Supplemental Note: Supplemental Benefit Overtime Rate: \$75.07

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

Shifts shall be any 8 consecutive hours after the normal working day for which the Glazier shall receive 9 hours pay for 8 hours worked.

(Local #1281)

GLAZIER - REPAIR & MAINTENANCE

(For the Installation of Glass - All repair and maintenance work on a particular building.)

Craft Jurisdiction for repair, maintenance and fabrication

Plate glass replacement, Residential glass replacement, Residential mirrors and shower doors, Storm windows and storm doors, Residential replacement windows, Herculite door repairs, Door closer repairs, Retrofit apartment house (non-commercial buildings), Glass tinting.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$26.40**

Supplemental Benefit Rate per Hour: **\$25.32**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Local #1281)

HAZARDOUS MATERIAL HANDLER

(Removal, abatement, encapsulation or decontamination of asbestos, lead, mold, or other toxic or hazardous waste/materials)

Handler

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$38.05**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$19.10**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$38.05**

Supplemental Benefit Rate per Hour: **\$19.60**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

Time and one half the regular hourly rate after 40 straight time hours in any work week.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Easter

Paid Holidays

None

(Local #78 and Local #12A)

HEAT AND FROST INSULATOR

Heat & Frost Insulator

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$62.71**

Supplemental Benefit Rate per Hour: **\$41.91**

Overtime Description

Double time shall be paid for supplemental benefits during overtime work.

8th hour paid at time and one half.

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Triple time the regular rate for work on the following holiday(s).
Labor Day

Paid Holidays

None

Shift Rates

The first shift shall work seven hours at the regular straight time rate. The second and third shift shall work seven hours the regular straight time hourly rate plus a fourteen percent wage and benefit premium. There must be a first shift to work the second shift, and a second shift to work the third shift. Off-hour jobs in occupied buildings may be worked on weekdays with an increment of one-dollar (\$1.00) per hour and eight (8) hours pay for seven (7) hours worked.

(Local #12) (BCA)

HOUSE WRECKER (TOTAL DEMOLITION)

House Wrecker - Tier A

On all work sites the first, second, eleventh and every third House Wrecker thereafter will be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). Other House Wreckers may be Tier B House Wreckers.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$38.23**

Supplemental Benefit Rate per Hour: **\$30.97**

House Wrecker - Tier B

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$27.46**

Supplemental Benefit Rate per Hour: **\$23.38**

Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL

Iron Worker - Ornamental

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.65**

Supplemental Benefit Rate per Hour: **\$61.62**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description

Time and one half the regular rate after a 7 hour day for a maximum of two hours on any regular work day (the 8th and 9th hour) and double time shall be paid for all work on a regular work day thereafter, time and one half the regular rate for Saturday for the first seven hours of work and double time shall be paid for all work on a Saturday thereafter.

Overtime

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Paid Holidays

None

Shift Rates

When two or three shifts are employed on a job, Monday through Friday, the second and third shift are paid eight and one half (8 ½) hours at the straight time rate for seven (7) hours of work, and ten (10) hours at the straight time rate for eight (8) hours of work. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, eight hours will be paid at straight time rate for seven hours of work, and all overtime shall be paid at time and one-half the regular straight time rates but on Sundays and Holidays, time and one-half the regular straight time rate shall be paid for all work up to seven (7) hours and double time shall be paid for all work thereafter.

(Local #580)

IRON WORKER - STRUCTURAL

Iron Worker - Structural

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$55.70**

Supplemental Benefit Rate per Hour: **\$84.79**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description

Monday through Friday- the first eight hours are paid at straight time, the 9th and 10th hours are paid at time and one-half the regular rate, all additional weekday overtime is paid at double the regular rate. Saturdays- the first eight hours are paid at time and one-half the regular rate, double time thereafter. Sunday-all shifts are paid at double time. Four Days a week at Ten (10) hours straight time is allowed.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates

Monday through Friday - First Shift: First eight hours are paid at straight time, the 9th & 10th hours are paid at time and a half, double time paid thereafter. Second and third Shifts: First eight hours are paid at time and one-half, double time thereafter. Saturdays: All shifts, first eight hours paid at time and one-half, double time thereafter: Sunday all shifts are paid at double time.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

(Local #40 & #361)

LABORER

(Foundation, Concrete, Excavating, Street Pipe Layer and Common)

Laborer

Excavation and foundation work for buildings, heavy construction, engineering work, and hazardous waste removal in connection with the above work. Landscaping tasks in connection with heavy construction work, engineering work and building projects. Projects include, but are not limited to pollution plants, sewers, parks, subways, bridges, highways, etc.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.00**

Supplemental Benefit Rate per Hour: **\$50.43**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

Paid Holidays

Labor Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Thanksgiving Day

Shift Rates

When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

LANDSCAPING

(Landscaping tasks, such as tree pruning, tree removing and spraying in connection with Green Infrastructure maintenance and the planting of street trees and trees in City parks, but not when such activities are performed as part of construction or reconstruction projects.)

Landscaper (Year 6 and above)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$35.06**

Supplemental Benefit Rate per Hour: **\$17.55**

Landscaper (Year 3 - 5)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$33.93**

Supplemental Benefit Rate per Hour: **\$17.55**

Landscaper (up to 3 years)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.09**

Supplemental Benefit Rate per Hour: **\$17.55**

Groundperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.09**

Supplemental Benefit Rate per Hour: **\$17.55**

Tree Remover / Pruner

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$40.76**

Supplemental Benefit Rate per Hour: **\$17.55**

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$29.39**

Supplemental Benefit Rate per Hour: **\$17.55**

Watering - Plant Maintainer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$23.68**

Supplemental Benefit Rate per Hour: **\$17.55**

Overtime Description

For all overtime work performed, supplemental benefits shall include an additional seventy-five (\$0.75) cents per hour.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Shift Rates

Work performed on a 4pm to 12am shift has a 15% differential. Work performed on a 12am to 8am shift has a 20% differential.

(Local #175)

MARBLE MECHANIC

Marble Setter

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$57.17**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$42.26**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$57.40**

Supplemental Benefit Rate per Hour: **\$42.66**

Marble Finisher

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$44.42**

Supplemental Benefit Rate per Hour: **\$39.46**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$44.65**

Supplemental Benefit Rate per Hour: **\$39.76**

Marble Polisher

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$43.35**

Supplemental Benefit Rate per Hour: **\$32.26**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$43.71**

Supplemental Benefit Rate per Hour: **\$32.46**

Marble Maintenance Finisher

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$27.01**

Supplemental Benefit Rate per Hour: **\$13.99**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$27.17**

Supplemental Benefit Rate per Hour: **\$14.23**

Overtime Description

Supplemental Benefit contributions are to be made at the applicable overtime rates.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

(Local #7)

MASON TENDER

Mason Tender

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$39.95**

Supplemental Benefit Rate per Hour: **\$31.99**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

The employer may work two (2) shifts with the first shift at the straight time wage rate and the second shift receiving eight (8) hours paid for seven (7) hours work at the straight time wage rate. When it is not possible to conduct alteration work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

(Local #79)

MASON TENDER (INTERIOR DEMOLITION WORKER)

Mason Tender Tier A

Tier A Interior Demolition Worker performs all burning, chopping, and other technically skilled tasks related to interior demolition work.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$37.69**

Supplemental Benefit Rate per Hour: **\$26.10**

Mason Tender Tier B

Tier B Interior Demolition Worker performs manual work and work incidental to demolition work, such as loading and carting of debris from the work site to an area where it can be loaded in to bins/trucks for removal. Also performs clean-up of the site when demolition is completed.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$26.88**

Supplemental Benefit Rate per Hour: **\$20.42**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

(Local #79)

METALLIC LATHER

Metallic Lather

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.40**

Supplemental Benefit Rate per Hour: **\$51.30**

Supplemental Note: For time and one half overtime - \$63.05 For double overtime - \$79.10

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates

Off-shift work outside of normal working hours shall receive straight time rate plus \$12 per hour for the first eight (8) hours.

(Local #46)

MILLWRIGHT

Millwright

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$57.80**

Supplemental Benefit Rate per Hour: **\$55.96**

Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates

Second and third shifts receives the straight time rate of pay plus fifteen (15%) percent allowing for one half hour for a meal. There must be a first shift to work a second and third shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) percent for weekday hours.

(Local #740)

MOSAIC MECHANIC

Mosaic Mechanic - Mosaic & Terrazzo Mechanic

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$52.75**

Supplemental Benefit Rate per Hour: **\$44.37**

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$51.14**

Supplemental Benefit Rate per Hour: **\$44.37**

Mosaic Mechanic - Machine Operator Grinder

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$51.14**

Supplemental Benefit Rate per Hour: **\$44.37**

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

(Local #7)

PAINTER

Painter - Brush & Roller

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$43.00**

Supplemental Benefit Rate per Hour: **\$38.78**

Supplemental Note: \$46.62 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.00**

Supplemental Benefit Rate per Hour: **\$38.78**

Supplemental Note: \$46.62 on overtime

Overtime

Time and one half the regular rate after a 7 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

(District Council of Painters #9)

PAINTER - LINE STRIPING (ROADWAY)

Striping - Machine Operator

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$15.27**

Supplemental Note: Overtime Supplemental Benefit rate - \$15.90

Lineperson (Thermoplastic)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$43.00**

Supplemental Benefit Rate per Hour: **\$15.27**

Supplemental Note: Overtime Supplemental Benefit rate - \$15.90

Striping Assistant & Traffic Safety

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$37.00**

Supplemental Benefit Rate per Hour: **\$15.27**

Supplemental Note: Overtime Supplemental Benefit rate - \$15.90

Overtime Description

For Paid Holidays: Employees will only receive Holiday Pay for holidays not worked if said employee worked both the regularly scheduled workday before and after the holiday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Vacation

Employees with one to two years service shall accrue vacation based on hours worked: 250 hours worked - 1 day vacation; 500 hours worked - 2 days vacation; 750 hours worked - 3 days vacation; 900 hours worked - 4 days vacation; 1,000 hours worked - 5 days vacation. Employees with two to five years service receive two weeks vacation. Employees with five to twenty years service receive three weeks vacation. Employees with twenty to twenty-five years service receive four weeks vacation. Employees with 25 or more years service receive five weeks vacation.

(Local #1010)

PAINTER - METAL POLISHER

METAL POLISHER

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$32.51**

Supplemental Benefit Rate per Hour: **\$10.92**

METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$33.46**

Supplemental Benefit Rate per Hour: **\$10.92**

METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$36.01**

Supplemental Benefit Rate per Hour: **\$10.92**

ASSISTANT METAL POLISHER

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$25.31**

Supplemental Benefit Rate per Hour: **\$10.44**

ASSISTANT METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$26.26**

Supplemental Benefit Rate per Hour: **\$10.44**

ASSISTANT METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$27.81**

Supplemental Benefit Rate per Hour: **\$10.44**

Overtime Description

All work performed on Saturdays shall be paid at time-in-a half. The exception being; for suspended scaffold work and work deemed as a construction project; an eight (8) hour shift lost during the week due to circumstances beyond the control of the employer, up to a maximum of eight (8) hours per week, may be worked on Saturday at the straight time rate.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Triple time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Shift Rates

Four Days a week at Ten (10) hours straight a day.

Local 8A-28A

Painter - Sign

Sign Painter

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$45.54**

Supplemental Benefit Rate per Hour: **\$22.29**

Assistant Sign Painter

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$38.70**

Supplemental Benefit Rate per Hour: **\$20.20**

Overtime Description

If any employee is required to work on any of the paid holidays then the employee shall receive double time rate of wages as well as the holiday pay for that day.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Vacation

At least 1 year of employment.....1 week

2 years or more of employment.....2 weeks

8 years or more of employment.....3 weeks

(Local #8A-28A)

Painter - Structural Steel

Painters on Structural Steel

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$53.00**

Supplemental Benefit Rate per Hour: **\$49.83**

Painter - Power Tool

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$59.50**

Supplemental Benefit Rate per Hour: **\$49.83**

Overtime Wage Rate: **\$6.50** above the "Painters on Structural Steel" overtime rate.

Overtime Description

Supplemental Benefits shall be paid for each hour worked, up to forty (40) hours per week for the period of May 1st to November 15th or up to fifty (50) hours per week for the period of November 16th to April 30th.

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

Second shift is paid at regular hourly wage rates plus a ten percent (10%) differential. There must be a first shift in order to work a second shift.

(Local #806)

PAPERHANGER

Paperhanger

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.37**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$39.06**

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

Evening shift - 4:30 P.M. to 12:00 Midnight (regular rate of pay); any work performed before 7:00 A.M. shall be at time and one half the regular base rate of pay.

(District Council of Painters #9)

PAVER AND ROADBUILDER

Paver & Roadbuilder - Formsetter

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$48.35**

Supplemental Benefit Rate per Hour: **\$50.19**

Supplemental Note: For time and one half overtime - \$54.44 For double overtime - \$58.69

Paver & Roadbuilder - Laborer

Paving and road construction work, regardless of material used, including but not limited to preparation of job sites, removal of old surfaces, asphalt and/or concrete, by whatever method, including but not limited to milling; laying of concrete; laying of asphalt for temporary, patchwork, and utility paving (but not production paving); site preparation and incidental work for installation of rubberized materials and similar surfaces; installation and repair of temporary construction fencing; slurry/seal coating, paving stones, maintenance of safety surfaces; play equipment installation, and other related work.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.48**

Supplemental Benefit Rate per Hour: **\$50.19**

Supplemental Note: For time and one half overtime - \$54.44 For double overtime - \$58.69

Production Paver & Roadbuilder - Screed Person

(Production paving is asphalt paving when using a paving machine or on a project where a paving machine is traditionally used)

Adjustment of paving machinery on production paving jobs.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$48.95**

Supplemental Benefit Rate per Hour: **\$50.19**

Supplemental Note: For time and one half overtime - \$54.44 For double overtime - \$58.69

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$48.35**

Supplemental Benefit Rate per Hour: **\$50.19**

Supplemental Note: For time and one half overtime - \$54.44 For double overtime - \$58.69

Production Paver & Roadbuilder - Shoveler

General laborer (except removal of surfaces - see Paver and Roadbuilder-Laborer) including but not limited to tamper, AC paint and liquid tar work.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$44.48**

Supplemental Benefit Rate per Hour: **\$50.19**

Supplemental Note: For time and one half overtime - \$54.44 For double overtime - \$58.69

Overtime Description

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 25%.

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

Memorial Day

Independence Day

Labor Day

Columbus Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Thanksgiving Day

Paid Holidays

Memorial Day
Independence Day
Labor Day
Thanksgiving Day

Shift Rates

When two shifts are employed, the work period for each shift shall be a continuous eight (8) hours. When three shifts are employed, each shift will work seven and one half (7 ½) hours but will be paid for eight (8) hours at the straight time rate since only one half (1/2) hour is allowed for meal time.

When two or more shifts are employed, single time will be paid for each shift.

Night Work - On night work, the first eight (8) hours of work will be paid for at the single time rate, except that production paving work shall be paid at 10% over the single time rate for the screed person, rakers and shovelers directly involved only. This differential is to be paid when there is only one shift and the shift works at night. All other workers will be exempt. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

PLASTERER

Plasterer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.03**

Supplemental Benefit Rate per Hour: **\$28.79**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Paid Holidays

None

Shift Rates

When it is not possible to conduct work during regular working hours (between 6:30am and 4:30pm), a shift differential shall be paid at the regular hourly rate plus a twelve percent (12%) per hour differential. Workers on shift work shall be allowed a paid one-half hour meal break.

(Local #262)

PLASTERER - TENDER

Plasterer - Tender

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$39.95**

Supplemental Benefit Rate per Hour: **\$31.99**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

When work commences outside regular work hours, workers receive an hour additional (differential) wage and supplement payment. Eight hours pay for seven hours work or nine hours pay for eight hours work.

(Mason Tenders District Council)

PLUMBER

Plumber

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$72.50**

Supplemental Benefit Rate per Hour: **\$41.45**

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Plumber - Temporary Services

Temporary Services - When there are no Plumbers on the job site, there may be three shifts designed to cover the entire twenty-four hour period, including weekends if necessary, at the following rate straight time.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.08**

Supplemental Benefit Rate per Hour: **\$33.08**

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Shift Rates

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday.

50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER (MECHANICAL EQUIPMENT AND SERVICE)
(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Plumber

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.60**

Supplemental Benefit Rate per Hour: **\$19.96**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

(Plumbers Local # 1)

PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$50.35**

Supplemental Benefit Rate per Hour: **\$29.73**

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday.
50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER: PUMP & TANK

Oil Trades (Installation and Maintenance)

Plumber - Pump & Tank

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$69.73**

Supplemental Benefit Rate per Hour: **\$28.48**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

All work outside the regular workday (8:00 A.M. to 3:30 P.M.) is to be paid at time and one half the regular hourly rate

(Plumbers Local #1)

POINTER, WATERPROOFER, CAULKER, SANDBLASTER, STEAMBLASTER (Exterior Building Renovation)

Journeyperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$58.83**

Supplemental Benefit Rate per Hour: **\$30.10**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:00 P.M.) is to be paid at time and one half the regular rate. However, the employer may establish one (1) or two (2) shifts starting at or after 4:00 P.M. to be paid at the regular hourly rate plus a 10% differential.

(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$45.25**

Supplemental Benefit Rate per Hour: **\$37.56**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

Second shift - Regular hourly rate plus a 10% differential. Third shift - Regular hourly rate plus a 15% differential. There must be a first shift to work the second shift, and a second shift to work the third shift. All other work outside the regular work day (an eight hour workday between the hours of 5:00 A.M. and 4:00 P.M.) is to be paid at time and one half the regular rate.

(Local #8)

SHEET METAL WORKER

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Sheet Metal Worker

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$52.10**

Supplemental Benefit Rate per Hour: **\$55.18**

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Sheet Metal Worker - Fan Maintenance

(The temporary operation of fans or blowers in new or existing buildings for heating and/or ventilation, and/or air conditioning prior to the completion of the project.)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$41.68**

Supplemental Benefit Rate per Hour: **\$55.18**

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$19.12**

Supplemental Benefit Rate per Hour: **\$12.01**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

Work that can only be performed outside regular working hours (eight hours of work between 7:30 A.M. and 3:30 P.M.) - First shift (work between 3:30 P.M. and 11:30 P.M.) - 10% differential above the established hourly rate.

Second shift (work between 11:30 P.M. and 7:30 A.M.) - 15% differential above the established hourly rate.

For Fan Maintenance: On all full shifts of fan maintenance work the straight time hourly rate of pay will be paid for each shift, including nights, Saturdays, Sundays, and holidays.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

(Local #28)

SHEET METAL WORKER - SPECIALTY
(Decking & Siding)

Sheet Metal Specialty Worker

The first worker to perform this work must be paid at the rate of the Sheet Metal Worker. The second and third workers shall be paid the Specialty Worker Rate. The ratio of One Sheet Metal Worker, then Two Specialty Workers shall be utilized thereafter.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$49.05**

Supplemental Benefit Rate per Hour: **\$27.76**

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

(Local #28)

SHIPYARD WORKER

Shipyard Mechanic - First Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$28.85**

Supplemental Benefit Rate per Hour: **\$3.93**

Shipyard Mechanic - Second Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.07**

Supplemental Benefit Rate per Hour: **\$3.79**

Shipyard Laborer - First Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.48**

Supplemental Benefit Rate per Hour: **\$3.77**

Shipyard Laborer - Second Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$17.93**

Supplemental Benefit Rate per Hour: **\$3.78**

Shipyard Dockhand - First Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.15**

Supplemental Benefit Rate per Hour: **\$3.70**

Shipyard Dockhand - Second Class

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$18.04**

Supplemental Benefit Rate per Hour: **\$3.61**

Overtime Description

Work performed on holiday is paid double time the regular hourly wage rate plus holiday pay.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

New Year's Day
Martin Luther King Jr. Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Based on Survey Data

SIGN ERECTOR

(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$53.79**

Supplemental Benefit Rate per Hour: **\$59.56**

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Time and one half the regular hourly rate is to be paid for all hours worked outside the regular workday either (7:00 A.M. through 2:30 P.M.) or (8:00 A.M. through 3:30 P.M.)

(Local #137)

STEAMFITTER

Steamfitter

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$61.30**

Supplemental Benefit Rate per Hour: **\$59.89**

Supplemental Note: Overtime supplemental benefit rate: \$119.04

Steamfitter -Temporary Services

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$46.59**

Supplemental Benefit Rate per Hour: **\$48.70**

Overtime Description

Double time after a 7 hour day except for Temporary Services.

Overtime

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

May be performed outside of the regular workday except Saturday, Sunday and Holidays. When shift work is performed the wage rate for regular time worked is a 15% percent premium on wage and 15% percent premium on supplemental benefits.

Local 638

STEAMFITTER - REFRIGERATION AND AIR CONDITIONER (Maintenance and Installation Service Person)

Refrigeration and Air Conditioner Mechanic

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$43.85**

Supplemental Benefit Rate per Hour: **\$19.96**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Independence Day

Labor Day

Veteran's Day

Thanksgiving Day

Christmas Day

Double time and one half the regular rate for work on the following holiday(s).

Martin Luther King Jr. Day

President's Day

Memorial Day

Columbus Day

Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

(Local #638-B)

STONE MASON - SETTER

Stone Mason - Setter

(Assisted by Derrickperson and Rigger)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$57.16**

Supplemental Benefit Rate per Hour: **\$50.17**

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

Shift Rates

For all work outside the regular workday (8:00 A.M. to 3:30 P.M. Monday through Friday), the pay shall be straight time plus a ten percent (10%) differential.

(Bricklayers District Council)

TAPER

Drywall Taper

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$48.47**

Supplemental Benefit Rate per Hour: **\$30.01**

Overtime

Time and one half the regular rate after a 7 hour day.

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

(Local #1974)

TELECOMMUNICATION WORKER

(Install/maintain/repair telecommunications cables carrying data, video, and/or voice except for installation on building construction/alteration/renovation projects.)

Telecommunication Worker

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.03**

Supplemental Benefit Rate per Hour: **\$23.15**

Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. \$22.84 for Staten Island only.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Lincoln's Birthday

Washington's Birthday

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays

New Year's Day
Lincoln's Birthday
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Employees have the option of observing either Martin Luther King's Birthday or the day after Thanksgiving instead of Lincoln's Birthday

Shift Rates

For any workday that starts before 8A.M. or ends after 6P.M. there is a 10% differential for the applicable worker's hourly rate.

Vacation

After 6 months.....one week.
After 12 months but less than 7 years.....two weeks.
After 7 or more but less than 15 years.....three weeks.
After 15 years or more but less than 25 years.....four weeks.

(C.W.A.)

TILE FINISHER

Tile Finisher

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$44.40**
Supplemental Benefit Rate per Hour: **\$35.56**

Overtime

Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TILE LAYER - SETTER

Tile Layer - Setter

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$57.41**

Supplemental Benefit Rate per Hour: **\$40.11**

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TIMBERPERSON

Timberperson

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$53.05**

Supplemental Benefit Rate per Hour: **\$53.94**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate. Benefits for off-shift work shall be paid at the straight time rate.

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$68.58**

Supplemental Benefit Rate per Hour: **\$60.19**

Tunnel Workers (Compressed Air Rates)

Includes shield driven liner plate portions or solidification portions work (8 hour shift) during excavation phase.

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$66.14**

Supplemental Benefit Rate per Hour: **\$58.29**

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$65.04**

Supplemental Benefit Rate per Hour: **\$57.14**

Outside Lock Tender, Outside Gauge Tender, Muck Lock Tender (Compressed Air Rates)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$63.74**

Supplemental Benefit Rate per Hour: **\$56.20**

Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$63.74**

Supplemental Benefit Rate per Hour: **\$56.20**

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$56.04**

Supplemental Benefit Rate per Hour: **\$52.83**

Blasters (Free Air Rates)

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$65.41**
Supplemental Benefit Rate per Hour: **\$57.80**

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$62.58**
Supplemental Benefit Rate per Hour: **\$55.38**

All Others (Free Air Rates)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$57.84**
Supplemental Benefit Rate per Hour: **\$51.26**

Microtunneling (Free Air Rates)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$50.06**
Supplemental Benefit Rate per Hour: **\$44.30**

Overtime Description

For work performed during excavation and primary concrete tunnel lining phases - Double time the regular rate after an 8 hour day and Saturday, Sunday and on the following holiday(s) listed below.
For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, Saturday, Sunday and double time the regular rate for work on the following holiday(s) listed below.
For Small-Bore Micro Tunneling Machines - Time and one-half the regular rate shall be paid for all overtime.
For work not listed above - Time and one half the regular rate after an 8 hour day and Saturday and double time the regular rate on Sunday and on the following holiday(s) listed below.

Paid Holidays

- New Year's Day
- Lincoln's Birthday
- President's Day
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day
- Thanksgiving Day
- Christmas Day

(Local #147)

UTILITY LOCATOR

(Locate & mark underground utilities for street excavation.)

Utility Locator (Year 7 and above)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.56**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Year 5 - 6)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.85**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Year 4)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$21.54**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Year 3)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$20.30**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Year 2)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$19.13**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Year 1)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$18.04**

Supplemental Benefit Rate per Hour: **\$1.43**

Utility Locator (Up to 1 year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$17.00**

Supplemental Benefit Rate per Hour: **\$1.43**

Supplemental Note: No benefits for the first 90 days of employment.

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CONSTRUCTION WORKER PREVAILING WAGE SCHEDULE

Overtime

Time and one half the regular rate for work on the following holiday(s).
Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays

New Year's Day
Memorial Day
Independence Day
Thanksgiving Day
Christmas Day

Shift Rates

10% shift differential to employees working any shift starting between noon and 5 AM.

Vacation

For up to 1 year 0 hours
For year 1 - 2 48 hours per year
For year 3 - 9 96 hours per year
For year 10 or more 144 hours per year

Sick Days:

For up to 1 year employee receives 40 hours paid sick leave.
For year 1 employee earns 2 hours of paid sick leave for every 100 overtime hours worked.
For year 2 - 9 years employee earns 4 hours of paid sick leave for every 100 overtime hours worked.
For year 10 or more employee earns 6 hours of paid sick leave for every 100 overtime hours worked.

(C.W.A.)

WELDER

**TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE
PERFORMING THE WORK.**

OFFICE OF THE COMPTROLLER

CITY OF NEW YORK

**CONSTRUCTION APPRENTICE
PREVAILING WAGE SCHEDULE**

Pursuant to Labor Law § 220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant and registered with the New York State Department of Labor, may be paid at the apprentice rates in this schedule. Apprentices who are not so registered must be paid as journey persons in accordance with the trade classification of the work they actually performed.

Apprentice ratios are established to ensure the proper safety, training and supervision of apprentices. A ratio establishes the number of journey workers required for each apprentice in a program and on a job site. Ratios are interpreted as follows: in the case of a 1:1, 1:4 ratio, there must be one journey worker for the first apprentice, and four additional journey workers for each subsequent apprentice.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

BOILERMAKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Boilermaker (First Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$33.57

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$35.54

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$37.51

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$39.48

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 85% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$41.45

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 90% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$43.42

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 95% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$45.39

(Local #5)

BRICKLAYER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Bricklayer (First 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 70% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 90% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 95% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$23.85

(Bricklayer District Council)

CARPENTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour For Building Apprentice: \$19.80

Supplemental Benefit Rate Per Hour For Building Apprentice: \$16.85

Wage Rate Per Hour For Heavy Apprentice: \$24.60

Supplemental Benefit Rate Per Hour For Heavy Apprentice: \$36.26

Carpenter (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour For Building Apprentice: \$22.80

Supplemental Benefit Rate Per Hour For Building Apprentice: \$18.35

Wage Rate Per Hour For Heavy Apprentice: \$30.20

Supplemental Benefit Rate Per Hour For Heavy Apprentice: \$36.26

Carpenter (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour For Building Apprentice: \$27.05

Supplemental Benefit Rate Per Hour For Building Apprentice: \$21.95

Wage Rate Per Hour For Heavy Apprentice: \$38.58

Supplemental Benefit Rate Per Hour For Heavy Apprentice: \$36.26

Carpenter (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour For Building Apprentice: \$34.93

Supplemental Benefit Rate Per Hour For Building Apprentice: \$23.95

Wage Rate Per Hour For Heavy Apprentice: \$46.97

Supplemental Benefit Rate Per Hour For Heavy Apprentice: \$36.26

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS

(Ratio of Apprentice to Journeyman: 1 to 1, 2 to 5)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Carpenter - High Rise (First Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$18.27
Supplemental Benefit Rate per Hour: \$16.55

Carpenter - High Rise (Second Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$24.70
Supplemental Benefit Rate per Hour: \$17.68

Carpenter - High Rise (Third Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$31.28
Supplemental Benefit Rate per Hour: \$17.81

Carpenter - High Rise (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$38.90
Supplemental Benefit Rate per Hour: \$17.96

(Carpenters District Council)

CEMENT AND CONCRETE WORKER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Cement & Concrete Worker (First 1333 hours)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 53% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$14.79

Cement & Concrete Worker (Second 1333 hours)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 69% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$19.72

Cement & Concrete Worker (Last 1334 hours)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 85% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$21.30

(Cement Concrete Workers District Council)

CEMENT MASON
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Cement Mason (First Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$19.92
Supplemental Benefit Rate per Hour: \$15.61

Cement Mason (Second Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$24.82
Supplemental Benefit Rate per Hour: \$15.91

Cement Mason (Third Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: \$30.22
Supplemental Benefit Rate per Hour: \$16.02

(Local #780)

DERRICKPERSON & RIGGER (STONE)
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Benefit Rate Per Hour: 50% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Derrickperson & Rigger (stone) - Second Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

Derrickperson & Rigger (stone) - Second Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

Derrickperson & Rigger (stone) - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

(Local #197)

DOCKBUILDER/PILE DRIVER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Dockbuilder/Pile Driver (First Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: \$24.60
Supplemental Benefit Rate Per Hour: \$36.26

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: \$30.20
Supplemental Benefit Rate Per Hour: \$36.26

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: \$38.58
Supplemental Benefit Rate Per Hour: \$36.26

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: \$46.97

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate Per Hour: \$36.26

(Carpenters District Council)

ELECTRICIAN

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Electrician (First Term: 0-6 Months)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$18.00**

Supplemental Benefit Rate per Hour: **\$15.68**

Overtime Supplemental Rate Per Hour: \$16.88

Electrician (First Term: 7-12 Months)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$18.50**

Supplemental Benefit Rate per Hour: **\$15.94**

Overtime Supplemental Rate Per Hour: \$17.17

Electrician (Second Term: 0-6 Months)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$19.50**

Supplemental Benefit Rate per Hour: **\$16.47**

Overtime Supplemental Rate Per Hour: \$17.76

Electrician (Second Term: 7-12 Months)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$20.50**

Supplemental Benefit Rate per Hour: **\$16.99**

Overtime Supplemental Rate Per Hour: \$18.35

Electrician (Third Term: 0-6 Months)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$21.50**

Supplemental Benefit Rate per Hour: **\$17.52**

Overtime Supplemental Rate Per Hour: \$18.94

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Electrician (Third Term: 7-12 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$22.50**
Supplemental Benefit Rate per Hour: **\$18.04**
Overtime Supplemental Rate Per Hour: **\$19.53**

Electrician (Fourth Term: 0-6 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$23.50**
Supplemental Benefit Rate per Hour: **\$18.56**
Overtime Supplemental Rate Per Hour: **\$20.12**

Electrician (Fourth Term: 7-12 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$25.50**
Supplemental Benefit Rate per Hour: **\$19.61**
Overtime Supplemental Rate Per Hour: **\$21.30**

Electrician (Fifth Term: 0-12 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$26.75**
Supplemental Benefit Rate per Hour: **\$22.88**
Overtime Supplemental Rate Per Hour: **\$24.57**

Electrician (Fifth Term: 13-18 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$31.25**
Supplemental Benefit Rate per Hour: **\$25.30**
Overtime Supplemental Rate Per Hour: **\$27.28**

Overtime Description

Overtime Wage paid at time and one half the regular rate

(Local #3)

ELEVATOR CONSTRUCTOR

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Elevator (Constructor) - First Year

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$33.38

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$34.64

Elevator (Constructor) - Second Year

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: \$33.96

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: \$35.24

Elevator (Constructor) - Third Year

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: \$35.10

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: \$36.43

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: \$36.24

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: \$37.63

(Local #1)

ELEVATOR REPAIR & MAINTENANCE
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: \$33.33

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: \$34.59

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: \$33.90

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: \$35.18

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: \$35.03

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: \$36.37

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2022 - 3/16/2023
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Per Hour: \$36.17

Effective Period: 3/17/2023 - 6/30/2023
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Per Hour: \$37.55

(Local #1)

ENGINEER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Engineer - First Year

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$27.47**
Supplemental Benefit Rate per Hour: **\$30.97**

Engineer - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$34.34**
Supplemental Benefit Rate per Hour: **\$30.97**

Engineer - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$37.77**
Supplemental Benefit Rate per Hour: **\$30.97**

Engineer - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$41.21**
Supplemental Benefit Rate per Hour: **\$30.97**

(Local #15)

ENGINEER - OPERATING
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 40% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: \$24.80

Operating Engineer - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 50% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: \$24.80

Operating Engineer - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 60% of Operating Engineer - Road & Heavy Construction V's Rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Supplemental Benefit Per Hour: \$24.80

(Local #14)

FLOOR COVERER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$24.80**

Supplemental Benefit Rate per Hour: **\$16.83**

Floor Coverer (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$27.80**

Supplemental Benefit Rate per Hour: **\$18.33**

Floor Coverer (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$32.05**

Supplemental Benefit Rate per Hour: **\$21.93**

Floor Coverer (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$39.93**

Supplemental Benefit Rate per Hour: **\$23.93**

(Carpenters District Council)

GLAZIER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Glazier (First Year)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Glazier (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Glazier (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Glazier (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #1281)

HAZARDOUS MATERIAL HANDLER
(Ratio of Apprentice Journeyperson: 1 to 1, 1 to 3)

Handler (First 1000 Hours)

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$20.00**

Supplemental Benefit Rate per Hour: **\$14.25**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$20.00**

Supplemental Benefit Rate per Hour: **\$14.75**

Handler (Second 1000 Hours)

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$21.00**

Supplemental Benefit Rate per Hour: **\$14.25**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$21.00**

Supplemental Benefit Rate per Hour: **\$14.75**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Handler (Third 1000 Hours)

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$24.00**

Supplemental Benefit Rate per Hour: **\$14.25**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$24.00**

Supplemental Benefit Rate per Hour: **\$14.75**

Handler (Fourth 1000 Hours)

Effective Period: 7/1/2022 - 7/3/2022

Wage Rate per Hour: **\$26.00**

Supplemental Benefit Rate per Hour: **\$14.25**

Effective Period: 7/4/2022 - 6/30/2023

Wage Rate per Hour: **\$26.00**

Supplemental Benefit Rate per Hour: **\$14.75**

(Local #78)

HEAT & FROST INSULATOR

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

(Local #12)

HOUSE WRECKER
(TOTAL DEMOLITION)
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

House Wrecker - First Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$20.80**
Supplemental Benefit Rate per Hour: **\$10.67**

House Wrecker - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$22.75**
Supplemental Benefit Rate per Hour: **\$10.67**

House Wrecker - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$24.25**
Supplemental Benefit Rate per Hour: **\$10.67**

House Wrecker - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$26.75**
Supplemental Benefit Rate per Hour: **\$10.67**

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Iron Worker (Ornamental) - First Year

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$20.63**
Supplemental Benefit Rate per Hour: **\$17.61**

Iron Worker (Ornamental) - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$24.22**
Supplemental Benefit Rate per Hour: **\$18.86**

Iron Worker (Ornamental) - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$27.80**
Supplemental Benefit Rate per Hour: **\$20.12**

Iron Worker (Ornamental) - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$31.38**
Supplemental Benefit Rate per Hour: **\$21.38**

(Local #580)

IRON WORKER - STRUCTURAL
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$28.97**
Supplemental Benefit Rate per Hour: **\$58.62**

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$29.57**
Supplemental Benefit Rate per Hour: **\$58.62**

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$30.18**

Supplemental Benefit Rate per Hour: **\$58.62**

(Local #40 and #361)

LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)

(Ratio Apprentice to Journeyman: 1 to 1, 1 to 3)

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - First 1000 hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Rate Per Hour: \$50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Second 1000 hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Rate Per Hour: \$50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third 1000 hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 75% of Journeyman's rate

Supplemental Rate Per Hour: \$50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Fourth 1000 hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 90% of Journeyman's rate

Supplemental Rate Per Hour: \$50.43

(Local #731)

MARBLE MECHANICS

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 45% of Journeyman's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 65% of Journeyman's rate

Cutters & Setters - Seventh 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 70% of Journeyman's rate

Cutters & Setters - Eighth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 75% of Journeyman's rate

Cutters & Setters - Ninth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Tenth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 900 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Polishers & Finishers - Second 900 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

Polishers & Finishers - Third 900 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

(Local #7)

MASON TENDER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Mason Tender - First Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$20.95**

Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.90**

Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender - Third Year

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$24.40**
Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$26.90**
Supplemental Benefit Rate per Hour: **\$10.82**

(Local #79)

MASON TENDER (INTERIOR DEMOLITION WORKER)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Mason Tender (Interior Demolition) - First Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$20.70**
Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender (Interior Demolition) - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$22.65**
Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender (Interior Demolition) - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$24.15**
Supplemental Benefit Rate per Hour: **\$10.82**

Mason Tender (Interior Demolition) - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$26.65**
Supplemental Benefit Rate per Hour: **\$10.82**

(Local #79)

METALLIC LATHER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Metallic Lather (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$22.55**

Supplemental Benefit Rate per Hour: **\$17.87**

Metallic Lather (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$23.60**

Supplemental Benefit Rate per Hour: **\$16.87**

Metallic Lather (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$24.60**

Supplemental Benefit Rate per Hour: **\$15.92**

Metallic Lather (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$37.18**

Supplemental Benefit Rate per Hour: **\$21.82**

(Local #46)

MILLWRIGHT

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Millwright (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.24**

Supplemental Benefit Rate per Hour: **\$35.94**

Millwright (Second Year)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$36.69**

Supplemental Benefit Rate per Hour: **\$39.64**

Millwright (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$42.14**

Supplemental Benefit Rate per Hour: **\$43.99**

Millwright (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$53.04**

Supplemental Benefit Rate per Hour: **\$50.75**

(Local #740)

PAINTER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Painter - Brush & Roller - First Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$17.20**

Supplemental Benefit Rate per Hour: **\$17.42**

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$21.50**

Supplemental Benefit Rate per Hour: **\$22.41**

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$25.80**

Supplemental Benefit Rate per Hour: **\$26.46**

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$34.40**

Supplemental Benefit Rate per Hour: **\$34.15**

(District Council of Painters)

PAINTER - LINE STRIPING (ROADWAY)
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painter - Line Striping (Roadway) - First Year (Minimum 1000 hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$30.36**

Supplemental Benefit Rate per Hour: **\$15.27**

Painter - Line Striping (Roadway) - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$32.00**

Supplemental Benefit Rate per Hour: **\$15.27**

(Local #1010)

PAINTER - METAL POLISHER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Metal Polisher (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$16.00**

Supplemental Benefit Rate per Hour: **\$7.96**

New Construction - Wage Rate Per Hour: **\$16.39**

Scaffold Over 34 Feet - Wage Rate Per Hour: **\$18.50**

Metal Polisher (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$17.00**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$7.96**
New Construction - Wage Rate Per Hour: **\$17.44**
Scaffold Over 34 Feet - Wage Rate Per Hour: **\$19.50**

Metal Polisher (Third Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$18.00**
Supplemental Benefit Rate per Hour: **\$7.96**
New Construction - Wage Rate Per Hour: **\$18.54**
Scaffold Over 34 Feet - Wage Rate Per Hour: **\$20.50**

(Local 8A-28)

PAINTER - STRUCTURAL STEEL
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painters - Structural Steel (First Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2022 - 6/30/2023
Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #806)

PAVER AND ROADBUILDER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$29.86**

Supplemental Benefit Rate per Hour: **\$24.60**

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$32.00**

Supplemental Benefit Rate per Hour: **\$24.60**

(Local #1010)

PLASTERER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

(Each Term is 800 Hours.)

Plasterer - First Term

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 55% of Journeyman's rate

Supplemental Rate Per Hour: \$17.48

Plasterer - Second Term

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Rate Per Hour: \$18.63

Plasterer - Third Term

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 70% of Journeyman's rate

Supplemental Rate Per Hour: \$20.93

Plasterer - Fourth Term

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 75% of Journeyman's rate

Supplemental Rate Per Hour: \$22.10

(Local #262)

PLASTERER - TENDER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Plasterer Tender - First Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$21.45**

Supplemental Benefit Rate per Hour: **\$10.32**

Plasterer Tender - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$23.40**

Supplemental Benefit Rate per Hour: **\$10.32**

Plasterer Tender - Third Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$24.90**

Supplemental Benefit Rate per Hour: **\$10.32**

Plasterer Tender - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$27.40**

Supplemental Benefit Rate per Hour: **\$10.32**

(Local #79)

PLUMBER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Plumber - First Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$16.78**

Supplemental Benefit Rate per Hour: **\$5.43**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$19.78**

Supplemental Benefit Rate per Hour: **\$6.43**

Plumber - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$28.99**

Supplemental Benefit Rate per Hour: **\$21.95**

Plumber - Third Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$31.09**

Supplemental Benefit Rate per Hour: **\$21.95**

Plumber - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$33.94**

Supplemental Benefit Rate per Hour: **\$21.95**

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$35.34**

Supplemental Benefit Rate per Hour: **\$21.95**

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.41**

Supplemental Benefit Rate per Hour: **\$21.95**

(Plumbers Local #1)

**POINTER, WATERPROOFER, CAULKER, SANDBLASTER,
STEAMBLASTER**

(Exterior Building Renovation)

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - First Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$29.86**

Supplemental Benefit Rate per Hour: **\$15.00**

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$33.74**

Supplemental Benefit Rate per Hour: **\$20.05**

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Third Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$39.02**

Supplemental Benefit Rate per Hour: **\$23.80**

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$47.05**

Supplemental Benefit Rate per Hour: **\$24.80**

(Bricklayer District Council)

ROOFER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

Roofer - First Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 35% of Journeyman's rate

Supplemental Benefit Rate Per Hour: **\$3.82**

Roofer - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Benefit Rate Per Hour: **\$18.92**

Roofer - Third Year

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$22.64

Roofer - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$28.24

(Local #8)

SHEET METAL WORKER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Sheet Metal Worker (0-6 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 25% of Journeyman's rate
Supplemental Rate Per Hour: \$6.84

Sheet Metal Worker (7-18 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 35% of Journeyman's rate
Supplemental Rate Per Hour: \$20.20

Sheet Metal Worker (19-30 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 45% of Journeyman's rate
Supplemental Rate Per Hour: \$27.48

Sheet Metal Worker (31-36 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$32.52

Sheet Metal Worker (37-42 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$32.52

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Sheet Metal Worker (43-48 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$40.08

Sheet Metal Worker (49-54 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$40.08

Sheet Metal Worker (55-60 Months)

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: \$45.12

(Local #28)

SIGN ERECTOR

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: \$17.09

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: \$19.39

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: \$21.70

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$24.02

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: \$32.50

Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: \$35.35

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: \$39.00

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$41.95

Sign Erector - Fifth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: \$44.89

Sign Erector - Sixth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: \$47.80

(Local #137)

STEAMFITTER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Steamfitter - First Year

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate and Supplemental Rate per Hour: 60% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate and Supplemental Rate Per Hour: 70% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

(Local #638)

**STEAMFITTER - REFRIGERATION & AIR CONDITIONER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)**

Refrigeration & Air Conditioner (First Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$21.23**

Supplemental Benefit Rate per Hour: **\$13.29**

Refrigeration & Air Conditioner (Second Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$25.63**

Supplemental Benefit Rate per Hour: **\$14.57**

Refrigeration & Air Conditioner (Third Year)

Effective Period: 7/1/2022 - 6/30/2023

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$29.85**

Supplemental Benefit Rate per Hour: **\$15.91**

Refrigeration & Air Conditioner (Fourth Year)

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate per Hour: **\$36.05**

Supplemental Benefit Rate per Hour: **\$17.72**

(Local #638-B)

STONE MASON - SETTER

(Ratio Apprentice of Journeyman: 1 to 1, 1 to 2)

Stone Mason - Setters - First 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Third 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 70% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Fourth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Fifth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage Rate Per Hour: 90% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Sixth 750 Hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate Per Hour: 100% of Journeyman's rate
Supplemental Rate Per Hour: 50% of Journeyman's rate

(Bricklayers District Council)

TAPER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Drywall Taper - First Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$20.97**
Supplemental Benefit Rate per Hour: **\$14.25**

Drywall Taper - Second Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$24.24**
Supplemental Benefit Rate per Hour: **\$21.26**

Drywall Taper - Third Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$29.08**
Supplemental Benefit Rate per Hour: **\$23.01**

Drywall Taper - Fourth Year

Effective Period: 7/1/2022 - 6/30/2023
Wage Rate per Hour: **\$38.78**
Supplemental Benefit Rate per Hour: **\$26.51**

(Local #1974)

TILE LAYER - SETTER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 35% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour 40% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Seventh 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Tile Layer - Setter - Eighth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Ninth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

Tile Layer - Setter - Tenth 750 Hours

Effective Period: 7/1/2022 - 6/30/2023

Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

Changes between the 1/1/2022 and 7/1/2022 Single Contract General Conditions

***NOTE:** The list below is intended as a guide and does not include minor editing.
The text of the General Conditions and the Addendum to the General Conditions govern.*

Section No. Change

01 10 00	1.10D: Update Mobilization Payment Add 1.13: Payments to M/WBE Subcontractors
01 22 00	New Section Added
01 40 00	1.7: update minimum and special experience qualifications
01 50 00	3.8B.3: Update DDC Field Office Trailer requirements 3.8D.3: Update Equipment for the DDC Field Office requirements
01 73 00	Add 3.25 Correction of the Work
01 77 00	Remove 3.2 Repair of the Work (moved into 017300, 3.25)



**Department of
Design and
Construction**

Issue Date: July 1, 2022

**DDC STANDARD GENERAL CONDITIONS
FOR SINGLE CONTRACT PROJECTS**



**Department of
Design and
Construction**

Issue Date: July 1, 2022

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**SECTION 01 10 00
SUMMARY**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. Addendum to the General Conditions: These General Conditions include and are supplemented by the Addendum to the General Conditions (the "Addendum"). The Addendum includes the following: (1) schedules referred to in these General Conditions, (2) information regarding the applicability of various articles, and (3) amended articles, if any.

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Scope and Intent
 - 2. Provisions Referenced in the Contract
 - 3. Performance of Work During Non-Regular Work Hours (Pursuant to a Change Order)
 - 4. Interruption of Services at Existing Facilities

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SCOPE AND INTENT:

- A. Description of Project: Refer to the Addendum for a description of the Project.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 B

- B. LEED: The City of New York will seek U.S. Green Building Council (USGBC) LEED (Leadership in Energy and Environmental Design) certification for this Project as specified in Section 01 81 13.03 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS"; or Section 01 81 13.04 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS", and the Addendum to the General Conditions.



REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 C

- C. COMMISSIONING: The Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE and the Addendum to the General Conditions. The Contractor must cooperate with the commissioning agent and provide whatever assistance is required.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 D

- D. PROGRESS SCHEDULE: Refer to Section 01 32 16.1 PROGRESS SCHEDULES (METHOD A) or 01 32 16.2 PROGRESS SCHEDULES (METHOD B) or 01 32 16.3 PROGRESS SCHEDULES (METHOD C) and the Addendum to the General Conditions for requirements of the Project.
- E. COMPLETION OF WORK: Work to be done under the Contract is comprised of the furnishing of all labor, materials, equipment and other appurtenances, and obtaining all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.
- F. OMISSION OF DETAILS: All work called for in the Specifications applicable to the Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and must be performed by the Contractor as though it were originally delineated or described. The cost of such work will be deemed included in the total Contract Price.
- G. WORK NOT IN SPECIFICATIONS OR CONTRACT DRAWINGS: Work not particularly specified in the Specifications nor detailed on the Contract Drawings but involved in carrying out their intent or in the complete and proper execution of the Work, is required, and must be performed by the Contractor. The cost of such work will be deemed included in the total Contract Price.
- H. SILENCE OF THE SPECIFICATIONS: The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, will be regarded as meaning that only the best practice is to prevail and that only the best material and workmanship is to be used and interpretation of the Specifications will be made upon that basis.
- I. CONFLICT BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS: Should any conflict occur in or between the Drawings and Specifications, the Contractor will be deemed to have estimated the most expensive way of doing the Work unless the Contractor asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what must govern.

1.5 CONTRACT DRAWINGS AND SPECIFICATIONS:

- A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum. Such drawings referred to in the Contract, and in the applicable Specifications for the Contract, bear the general title:

City of New York
Department of Design and Construction
Division of Public Buildings
- B. DOCUMENTS FURNISHED TO THE CONTRACTOR - After the award of the Contract, the Contractor will be furnished with five (5) complete sets of paper prints of all Contract Drawings mentioned in Paragraph A above, as well as a copy of the Specifications.
- C. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.



- D. SUPPLEMENTARY DRAWINGS - When, in the opinion of the Commissioner, it becomes necessary to more fully explain the work to be done, or to illustrate the work further, or to show any changes which may be required, drawings known as Supplementary Drawings will be prepared by the Commissioner.
- E. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefore to the Contractor will be subject to the terms of the Contract. The Supplementary Drawings will be binding upon the Contractor with the same force as the Contract Drawings.
- F. SUPPLEMENTARY DRAWING PRINTS - Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.
- G. COPIES TO SUBCONTRACTORS - The Contractor must furnish each of its subcontractors and material suppliers such copies of Contract Drawings, Supplementary Drawings, or copies of the Specifications as may be required for its work.

1.6 COORDINATION:

- A. COORDINATION AND COOPERATION - The Contractor must consult and study the requirements of the Contract Drawings and Specifications for all required work, including all work to be performed by trade subcontractors, so that the Contractor may become acquainted with the work of the Project as a whole in order to achieve the proper coordination and cooperation necessary for the efficient and timely performance of the work.
- B. CONTRACTOR TO CHECK DRAWINGS: - The Contractor must verify all dimensions, quantities and details shown on the Contract Drawings, Schedules, or other data received from the Commissioner, and must notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors will be given before the Contractor proceeds with any work. Figures must be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

1.7 SHOP DRAWINGS AND RECORD DRAWINGS:

- A. Refer to Section 01 33 00 SUBMITTAL PROCEDURES and Section 01 78 39 CONTRACT RECORD DOCUMENTS for requirements applicable to shop drawings and record drawings.

1.8 TEMPORARY FACILITIES, SERVICES AND CONTROLS:

- A. Refer to Section 01 50 00 TEMPORARY FACILITIES SERVICES AND CONTROLS for the responsibilities of the Contractor.

1.9 DUST CONTROL:

- A. The Contractor must prepare, execute and manage a “Dust Control Plan” for the prevention of the emission of dust from construction related activities in compliance with 15 RCNY 13-01 et. seq.

1.10 PROVISIONS REFERENCED IN THE CONTRACT:

- A. SCHEDULE A - Various Articles of the Contract refer to requirements set forth in Schedule A of the General Conditions. Schedule A, which is included in the Addendum, sets forth (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the Contract.
- B. EXTENSION OF TIME - Applications for Extensions of Time, as indicated in Article 13 of the Contract, must be made in accordance with the Rules of the Procurement Policy Board.



- C. PARTIAL PAYMENTS FOR MATERIALS IN ADVANCE OF THEIR INCORPORATION IN THE WORK PURSUANT TO ARTICLE 42 OF THE CONTRACT – In order to better ensure the availability of materials, fixtures and equipment when needed for the work, the Commissioner may authorize partial payment for certain materials, fixtures and equipment, prior to their incorporation in the work, but only in strict accordance with, and subject to, all the terms and conditions set forth in the Specifications, unless an alternate method of payment is elsewhere provided in the Specifications for specified materials, fixtures or equipment.
1. The Contractor must submit to the Commissioner a written request, in quadruplicate, for payment for materials purchased or to be purchased for which the Contractor needs to be paid prior to their actual incorporation in the work. The request must be accompanied by a schedule of the types and quantities of materials, and must state whether such materials are to be stored on or off the site.
 2. Where the materials are to be stored off the site, they must be stored at a place other than the Contractor's premises (except with the written consent of the Commissioner) and under the conditions prescribed or approved by the Commissioner. The Contractor must set apart and separately store at the place or places of storage all materials and must clearly mark same "PROPERTY OF THE CITY OF NEW YORK", and further, must not at any time move any of said materials to another off-site place of storage without the prior written consent of the Commissioner. Materials may be removed from their place of storage off the site for incorporation in the work upon approval of the Resident Engineer.
 3. Where the materials are to be stored at the site, they must be stored at such locations as will be designated by the Resident Engineer and only in such quantities as, in the opinion of the Resident Engineer, will not interfere with the proper performance of the Work by the Contractor or by other Contractors then engaged in performing work on the site. Such materials must not be removed from their place of storage on the site except for incorporation in the Work, without the approval of the Resident Engineer.
 4. INSURANCE
 - a. STORAGE OFF-SITE – Where the materials are stored off the site and until such time as they are incorporated in the Work, the Contractor must fully insure such materials against any and all risks of destruction, damage or loss including but not limited to fire, theft, and any other casualty or happening. The policy of insurance must be payable to the City of New York. It must be in such terms and amounts as must be approved by the Commissioner and must be placed with a company duly licensed to do business in the State of New York. The Contractor must deliver the original and one (1) copy of such policy or policies marked "Fully Paid" to the Commissioner.
 - b. STORAGE ON THE SITE – Where the materials are stored at the site, the Contractor must furnish satisfactory evidence to the Commissioner that they are properly insured against loss, by endorsements or otherwise, under the policy or policies of insurance obtained by the Contractor to cover losses to materials owned or installed by the Contractor. The policy of insurance must cover fire and extended coverage against windstorm, hail, explosion and riot attending a strike, civil commotion, aircraft, vehicles and smoke.
 5. All costs, charges and expenses arising out of the storage of such materials, must be paid by the Contractor and the City hereby reserves the right to retain out of any partial or final payment made under the Contract an amount sufficient to cover such costs, charges and expenses with the understanding that the City will have and may exercise any and all other remedies at law for the recovery of such cost, charges and expenses. There will be no increase in the Contract price for such costs, charges and expenses and the Contractor must not make any claim or demand for compensation therefore.



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6. The Contractor must pay any and all costs of handling and delivery of materials, to the place of storage and from the place of storage to the site of the Work; and the City will have the right to retain from any partial or final payment an amount sufficient to cover the cost of such handling and delivery.
7. In the event that the whole or any part of these materials are lost, damaged, or destroyed in advance of their satisfactory incorporation in the work, the Contractor, at the Contractor's own cost, must replace such lost, damaged or destroyed materials of the same character and quality. The City will reimburse the Contractor for the cost of the replaced materials to the extent, and only to the extent, of the funds actually received by the City under the policies of insurance hereinbefore referred to. Until such time as the materials are replaced, the City will deduct from the value of the stored materials or from any other money due under the Contract, the amount paid to the Contractor for such lost, damaged or destroyed materials.
8. Should any of the materials paid for the City hereunder be subsequently rejected or incorporated in the work in a manner or by a method not in accordance with the Contract Documents, the Contractor must remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract Documents. Until such materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.
9. Payments for the cost of materials made hereunder will not be deemed to be an acceptance of such materials as being in accordance with the Contract Documents, and the Contractor always retains and must comply with the Contractor's duty to deliver to the site and properly incorporate in the work only materials which comply with the Contract Documents.
10. The Contractor must retain any and all risks in connection with the damage, destruction, or loss of the materials paid for hereunder to the time of delivery of the same to the site of the Work and their proper incorporation in the work in accordance with the Contract Documents.
11. The Contractor must comply with all laws and the regulations of any governmental body or agency pertaining to the priority purchase, allocation, and use of the materials.
12. When requesting payment for such materials, the Contractor must submit with the partial estimate duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The executed bills of sale must transfer title to the materials from the Contractor to the City. (In the event that the invoices state that the material has been purchased by a subcontractor, bills of sale in quadruplicate will also be required transferring title to the materials from subcontractor to the Contractor).
13. Where the Contractor, with the approval of the Commissioner, has purchased unusually large quantities of materials in order to assure their availability for the work, the Commissioner, at the Commissioner's option, may waive the requirements of Paragraph 12 provided the Contractor furnishes evidence in the form of an affidavit from the Contractor in quadruplicate, and such other proof as the Commissioner may require, that the Contractor is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor will pay for such materials and submit proof thereof, in the same manner as provided in Paragraph 12 hereof, within seven (7) days after receipt of payment therefore from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, will preclude the Contractor from payments under the Contract.
14. The Contractor must include in each succeeding partial estimate requisition a summary of materials stored which must set forth the quantity and value of materials in storage, on or off the site, at the end of each preceding estimate period; the amount removed for incorporation in the



Work; the quantity and value of materials delivered during the current period and the total value of materials on hand for which payment thereof will be included in the current payment estimate.

15. Upon proof to the satisfaction of the Commissioner of the actual cost of such materials and upon submission of proper proof of title as required under Paragraph 12 or Paragraph 13 hereof, payment will be made therefore to the extent of 85%, provided however, that the cost so verified, established and approved must not exceed the estimated cost of such materials included in the approved detailed breakdown estimate submitted in accordance with Article 41 of the Contract; if it does, the City will pay only 85% approved estimated cost.
 16. Upon the incorporation in the Work of any such materials, which have been paid for in advance of such incorporation in accordance with the foregoing provisions, payment will be made for such materials incorporated in the Work pursuant to Article 42 of the Contract, less any sums paid pursuant to Paragraph 15 herein.
- D. **MOBILIZATION PAYMENT** – A line item for mobilization must be allowed on the Contractor’s Detailed Bid Breakdown submitted in accordance with Article 41 of the Contract. The Mobilization Payment is intended to include the cost of required bonds, insurance coverage, and/or any other expenses required for the initiation of the Contract Work. All costs for mobilization will be deemed included in the total Contract Price. The Detailed Bid Breakdown must reflect, and the Mobilization Payment will be made, in accordance with the following schedule:

Contract Amount	Mobilization Amount
\$0 - \$10,000,000	8% of contract amount
\$10,000,001 - \$50,000,000	8% on the first \$10,000,000 plus 4% of contract amount greater than \$10,000,000
Over \$50,000,000	\$2,400,000

The Contractor may requisition for the Mobilization Payment upon satisfactory completion of the following:

1. DDC approval of the Detailed Bid Breakdown per Article 41 of the Contract;
 2. Selection and DDC approval of any required field office location(s);
 3. Submission of all required insurance certificates and bond;
 4. Approval of the Site Safety Plan per the Safety Requirements Section of the Information for Bidders;
 5. Approval of the Progress Schedule;
 6. Approval of the Schedule Submittal; and,
 7. Submission of the Pre-Construction Photographs.
- E. **ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING:** The Contractor must submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel in Non-Road Vehicles, and the implementation of Best Available Technology (BAT), as set forth in Article 5.4 of the Contract. Such reports must be submitted in accordance with the schedule, format, directions, and procedures established by the Commissioner.



1.11 PERFORMANCE OF WORK DURING NON-REGULAR WORK HOURS:

- A. **NON-REGULAR WORK HOURS:** The Commissioner may issue a change order in accordance with Article 25 of the Contract which, (1) directs the Contractor to perform the Work, or specific components thereof, during other than regular work hours (i.e., evenings, weekends and holidays), and (2) provides compensation to the Contractor for costs in connection with the performance of Work during other than regular work hours. The Commissioner may issue a change order if a delay has occurred and such delay is not the fault of the Contractor, or if the Work is of such an important nature that delay in completing such work would result in serious disadvantage to the public.
- B. **PROCEDURE:** The Contractor must: (1) obtain whatever permits may be required for performance of the Work during other than regular business hours, and (2) pay all necessary fees in connection with such permits. In addition, if directed by the Commissioner, the Contractor must make immediate application to the Commissioner of the Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.

1.12 INTERRUPTION OF SERVICES AT EXISTING FACILITIES:

- A. **EVENING AND WEEKEND WORK -** Where performance of the Work requires the temporary shutdown(s) of services, such shutdown(s) must be made at night or on weekends or at such times that will cause no interference with the established routines and operations of the facility in question.
 - 1 Where weekend or evening work is required due to unavoidable service shutdowns, such work will be performed at no extra cost to the City. Components of the Work that must be performed during other than regular work hours are indicated in the Drawings and/or the Specifications.
- B. **INTERRUPTION OF EXISTING FACILITIES:**
 - 1 The Contractor must not interrupt any of the services of the facility nor interfere with such services in any way without the permission of the Commissioner. Such interruption or interferences must be made as brief as possible, and only at such time stated.
 - 2 Under no circumstances will the Contractor, its subcontractors, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.
 - 3 Unnecessary noise must be avoided at all times and necessary noise must be reduced to a minimum.
 - 4 Toilet facilities, water, and electricity must be operational at all times (i.e. 24/7). No services of the facility can be interrupted in any way without the permission of the Commissioner. Careful coordination of all Work with the Resident Engineer must be done to maintain the operational level of the Project personnel at the facility.
 - 5 The Contractor must schedule the Work to avoid noise interference that will affect the normal functions of the facility. In particular, construction operations producing noises that are objectionable to the functions of the facility must be scheduled at times of day or night, day of the week, or weekend, which will not interfere with personnel at the facility. Any additional cost resulting from this scheduling will be borne by the Contractor.
 - 6 The Contractor must arrange to work continuously, including evening and weekend hours, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing facility.
 - 7 The Contractor must give ample written notice in advance to the Commissioner and personnel at the facility of any required shutdown.



1.13 PAYMENTS TO M/WBE SUBCONTRACTORS:

- A. The Department of Design and Construction (“DDC”) is committed to supporting the growth and success of Minority and Women-owned Business Enterprises (“M/WBE”). In furtherance of this goal, DDC complies with Local Law 1 / NYC Administrative Code section 6-129, as amended. In order to support the growth and success of M/WBEs on all DDC projects, it is important that M/WBE vendors that are sub-contractors (any tiers) are treated fairly at all times and that their payment requisitions / invoices are handled in accordance with the City’s Standard Construction Contract. Pursuant to the Standard Construction Contract, prime contractors are required to pay subcontractors within thirty (30) days of receipt of such funds from DDC. Failure to comply with the Standard Construction Contract and the goals established by DDC as it applies to M/WBEs, may result in financial sanctions and negative performance evaluations, which will be taken into consideration on future procurements.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 10 00



SECTION 01 22 00

EXPANDED WORK ALLOWANCE

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 22 00

PART I - GENERAL

1.1 PURPOSE

- A. An Allowance has been established for the items set forth in sub-section 1.3 below (“Expanded Work Allowance” or “EWA”). Payment for the items set forth in sub-section 1.3 (“Expanded Work Items”) may be made through the EWA, as directed by the Commissioner. “Extra Work”, “overrun”, and “Allowance” are defined by the Standard Construction Contract (see Articles 2.1.16, 26.1, and 2.1.4, respectively) and nothing in this Section alters, or will be deemed to alter the interpretation or application of, the Standard Construction Contract, including but not limited to Articles 25, 26, 28, and 78 of the Standard Construction Contract.

1.2 PROCESS

- A. If the Commissioner determines that use of the EWA is appropriate, in their sole discretion, the Commissioner will prepare a written scope document for the Expanded Work Items for the Contractor’s execution (“EWA Scope Memo”). The EWA Scope Memo will set forth the maximum amount payable from the EWA prior to the execution of a final cost memorandum (“Maximum Amount”), in accordance with this Section. The Maximum Amount may be increased from time to time by the Commissioner, in their sole discretion, except that the Maximum Amount may not exceed 80% of the Commissioner’s estimated total cost for such Work (the “Estimated Cost”) unless and until a final cost is determined and a final cost memorandum (“Final Cost Memo”) executed in accordance with this Section.
- B. Neither the Maximum Amount nor the Estimated Cost will be deemed to be the final cost of the Expanded Work Items. The final cost for the Expanded Work Items will be determined in accordance with Article 26 of the Standard Construction Contract. The Contractor must submit its detailed price proposal for the Expanded Work Items, calculated in accordance with the Contract, within the time period set forth in the EWA Scope Memo or within 90 Days after the executed EWA Scope Memo is issued to the Contractor, whichever is sooner.
- C. Once the EWA Scope Memo is executed and the Contractor is directed to proceed with the Work, DDC will make progress payments, as provided in the Contract, up to the Maximum Amount or until the submission period has expired, whichever occurs sooner.
- D. DDC will not make any progress payments for the performance of the Expanded Work Items beyond the submission period set forth in sub-Section C, above, unless and until a final cost has been determined and a Final Cost Memo executed in accordance with this Section. No amounts above the Maximum Amount set by the Commissioner will be payable from the EWA, unless and until a final cost has been determined and a Final Cost Memo executed in accordance with this Section. In all events, the Contractor shall promptly and diligently comply with the Commissioner’s direction and perform all Work required by the Contract and the EWA Scope Memo.
- E. Upon receipt of the Contractor’s cost detailed proposal, DDC will evaluate the proposal and initiate negotiations, as necessary, to determine the final cost of the Expanded Work Items in accordance with Article 26 of the Standard Construction Contract. The Contractor is responsible to furnish time and material records



in accordance with Article 28 of the Standard Construction Contract until a Final Cost Memo is executed. If the parties cannot agree on a unit price or fixed price, the Contractor will be paid on the basis of time and material records in accordance with Article 26 the Standard Construction Contract.

- F. A Final Cost Memo will be prepared by the Commissioner to be executed by the parties. The total net sum of the amounts added and/or credited under the EWA Scope Memo and payment of the finalized Final Cost Memo constitutes full accord and satisfaction for the costs resulting from the Expanded Work Items. In the event the EWA is insufficient to pay the full amount of the Final Cost Memo, the parties agree to execute change order documents for the remaining funds, subject to registration in accordance with the New York City Charter.

1.3 PRICE TO COVER

- A. Expanded Work Items are those items set forth below. The EWA may be used, in the Commissioner's discretion, for the following Expanded Work Items:
 - 1. Non-material changes in the Work necessary to complete Contract Work due to site conditions that differ from those included in the Contract Documents and that could not have been anticipated by the Contractor.
 - 2. Non-material changes in the Work directed by the Commissioner that result in a net change in the cost to the Contractor for the Work to be performed under this Contract, including but not limited to the following:
 - a. Overruns of unit price items and quantity increases in portions of work within a lump sum item.
 - b. NYCDOT traffic stipulations or permit requirements that significantly differ from those included in the Contract Documents and that could not have been anticipated by the Contractor.
 - c. Changes to the sizes of materials or changes to specifications of materials.
 - d. Materials/structures not included in the Contract Documents that are necessary to complete Contract Work and that could not have been anticipated by the Contractor.

1.4 BASIS OF PAYMENT

- A. The fixed sum must be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded, and the original price will be used to determine the total amount bid for the contract.
- B. The payment(s) made under this item will be equal to the Final Cost Memo prepared by the Commissioner and executed by the parties in accordance with 1.2(F) above as proof of work performed for this item as approved by the Commissioner.
- C. The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Submission Form and shall not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.
- D. The price will cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications, and the directions of the Commissioner.

PART II – PRODUCTS (Not Used)
PART III – EXECUTION (Not Used)

END OF SECTION 01 22 00

EXPANDED WORK ALLOWANCE
01 22 00 - 2



**SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. LEED: Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
- C. COMMISSIONING: Refer to the Addendum to identify whether this Project will be commissioned by an independent third party under separate contract with the City of New York (City). Commissioning will be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE COMMISSIONING. The Contractor must cooperate with the commissioning agent and provide whatever assistance is required.

1.2 SUMMARY:

- A. This Section includes administrative provisions for coordinating construction operations on the Project, including:
 - 1. Coordination Drawings
 - 2. Administrative and supervisory personnel
 - 3. Project meetings
 - 4. Requests for Interpretation (RFIs)
- B. This Section includes the following:
 - 1. Definitions
 - 2. Coordination
 - 3. Submittals
 - 4. Administrative and Supervisory Personnel
 - 5. Project Meetings
 - 6. Requests for Interpretation (RFI's)
 - 7. Correspondence
 - 8. Contractor's Daily Reports
 - 9. Alternate and Substitute Equipment
- C. Related Sections:
 - 1. Section 01 10 00 SUMMARY
 - 2. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
 - 3. Section 01 33 00 SUBMITTALS
 - 4. Section 01 35 26 SAFETY REQUIREMENTS
 - 5. Section 01 73 00 EXECUTION REQUIREMENTS
 - 6. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL



7. Section 01 77 00 CLOSEOUT PROCEDURES

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 COORDINATION:

- A. Coordination: The Contractor must coordinate its construction operations, including those of its subcontractors, with other entities to ensure the efficient and orderly installation of each part of the Work. The Contractor must coordinate the various operations required by different Sections of the Specifications that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence in order to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum access for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and access for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. The Contractor must prepare memoranda for distribution to its subcontractors and other involved entities, outlining special procedures required for coordination. Such memoranda must include required notices, reports, and meeting minutes as applicable.
- C. Administrative Procedures: The Contractor must coordinate scheduling and timing of required administrative procedures with other construction activities and activities of its subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include without limitation the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Installation and removal of temporary facilities and controls.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - 5. Pre-installation conferences.
 - 6. Startup and adjustment of systems.
 - 7. Project closeout activities.
- D. Conservation: The Contractor must coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
- E. Salvaged Items, Material and/or Equipment: The Specifications may identify certain items, materials or equipment which must be salvaged by the Contractor and handled or disposed of as directed. The



Contractor must comply with all directions in the Specifications regarding the salvaging and handling of identified items, material or equipment.

- F. Software: The Contractor may be required by the Commissioner to utilize a designated cloud-based Construction Management Tool to streamline and manage activities, including but not limited to the following:
1. Submittals;
 2. Drawings, Specifications, and Bulletins;
 3. RFI's;
 4. Progress Photographs;
 5. Letters and Correspondence;
 6. Punchlists and Closeout Management;
 7. Daily Logs;
 8. Meetings and Minutes; and/or,
 9. Change Order log memos.

1.5 SUBMITTALS:

- A. Submit shop drawings, product data, samples etc., in compliance with Section 01 33 00 SUBMITTAL PROCEDURES.
- B. Coordination Drawings: The Contractor must prepare applicable Coordination Drawings in compliance with the requirements for Coordination Drawings in Section 01 33 00 SUBMITTAL PROCEDURES.
- C. Safety Plan in compliance with Section 01 35 26 SAFETY REQUIREMENTS PROCEDURES.
- D. Waste Management Plan in compliance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
- E. Key Personnel Names: Within fifteen (15) Days after the Notice to Proceed (NTP), the Contractor must submit a list of key personnel assignments of the Contractor and its subcontractors, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in case of the absence of individuals assigned to Project.
1. Post copies of the list in Project meeting room, in temporary field office, and by each temporary telephone. Keep the list current at all times.
 2. In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordinating all operations by its subcontractors.

1.6 PROJECT MEETINGS:

- A. General: The Resident Engineer will hold regularly scheduled construction progress meetings at the site, at which time the Contractor and appropriate subcontractors must have their representatives present to discuss all details relative to the execution of the work. The Resident Engineer will preside over these meetings.
1. Agenda: Prior to each meeting, the Resident Engineer will consult with the Contractor and will prepare an agenda of items to be discussed. In general, after informal discussion of any item on the agenda, the Resident Engineer will summarize the discussion in a brief written statement, and the Contractor will then dictate a brief statement for the record.



2. Coordination: In addition to construction progress meetings called by the Resident Engineer, the Contractor must hold regularly scheduled meetings for the purpose of coordinating, expediting and scheduling the work in accordance with the master coordinated Job Progress Chart. The Contractor and its subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the Contractor, be held at the same place and immediately following the Project meetings held by the Resident Engineer. Minutes of these meetings must be recorded, typed and printed by the Contractor and distributed to all parties concerned.
- B. Preconstruction Kick-Off Meeting:
1. The Resident Engineer will schedule a preconstruction kick-off meeting either at DDC's main office or at the Project site to review responsibilities and personnel assignments and clarify the role of each participant. Unless otherwise directed, the Design Consultant will record and distribute meeting minutes.
 2. Attendees: Authorized representative of the Sponsor Agency; Design Consultant; the Contractor and its superintendents, subcontractor(s) and their superintendent(s); LEED sub-consultant and Commissioning Authority /Agent (CxA) as applicable and other concerned parties. All participants at the meeting must be familiar with the Project and authorized to conclude matters relating to the Contract Work.
 3. Agenda: Includes without limitation the following as applicable:
 - a. Establishing construction schedule;
 - b. Schedule for regular construction meetings;
 - c. Phasing;
 - d. Critical Work sequencing and long-lead items;
 - e. Designation of key personnel and their duties;
 - f. Reviewing application for payment and change order procedures;
 - g. Procedures for RFIs;
 - h. Review permits and approval requirements;
 - i. Review all recent administrative code reporting requirements relating to the Project, (i.e. LL 77, LL86 etc.);
 - j. Procedures for testing and inspecting;
 - k. Reviewing special conditions at the Project site;
 - l. Distribution of the Contract Documents;
 - m. Submittal procedures;
 - n. Safety procedures;
 - o. LEED requirements;
 - p. Commissioning requirements;
 - q. Preparation of record documents;
 - r. Historic Treatment requirements;
 - s. Use of the premises;
 - t. Work restrictions;
 - u. Sponsor Agency occupancy requirements;
 - v. Responsibility for temporary facilities, services, and controls;
 - w. Construction Waste Management and Disposal;
 - x. Indoor Air Quality Management Plan;



- y. Dust Mitigation Plan;
 - z. Office, work, and storage areas;
 - aa. Equipment deliveries and priorities;
 - bb. Security;
 - cc. Progress cleaning; and,
 - dd. Working hours;
- C. Construction Progress Meetings:
- 1. The Resident Engineer will schedule and conduct construction progress meetings at bi-weekly intervals or as otherwise determined. All participants at the meeting must be familiar with the Project and authorized to conclude matters relating to the Work. Unless otherwise directed, the Design Consultant will record and distribute meeting minutes.
 - 2. Attendees:
 - a. Design Consultant and applicable sub-consultants;
 - b. Sponsor Agency Representative;
 - c. Representatives from the Contractor, sub-contractor(s), suppliers or other entities involved in the current progress, planning, coordination or future activities of the Work; and,
 - d. Other appropriate DDC personnel, DDC consultants and concerned parties.
 - 3. Agenda: Includes without limitation the following:
 - a. Review the Construction Schedule and progress of the Work. Determine if the Work is on time, ahead of schedule or behind schedule. Determine actions to be taken to maintain or accelerate the schedule;
 - b. Review and approve prior meeting minutes and follow up open issues;
 - c. Coordinate work between each subcontractor;
 - d. Sequence of Operations;
 - e. Status of submittals, deliveries, and off-site fabrication;
 - f. Status of inspections and approvals by governing agencies;
 - g. Temporary facilities and controls;
 - h. Review Site Safety;
 - i. Quality and work standards;
 - j. Field observations;
 - k. Status of correction of deficient items;
 - l. RFI's;
 - m. Pending changes;
 - n. Status of outstanding payments and change orders;
 - o. LEED requirements including Construction Waste Management, Indoor Air Quality Plan, Dust Mitigation and Commissioning; and,
 - p. Status of Administrative Code reporting requirements related to the Project.
- D. Preinstallation Conferences:
- 1. The Contractor will conduct a preinstallation conference at project site before each construction activity when required by other specification Sections and when required for coordination with other construction.
 - 2. Attendees:



- a. Contractor and its superintendents
- b. Applicable subcontractor(s)
- c. Representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow.
3. Advise the Commissioner of scheduled preinstallation conference meeting dates.
4. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents
 - b. Related RFI's
 - c. Deliveries
 - d. Submittals
 - e. Review of mockups
 - f. Possible conflicts
 - g. Compatibility requirements
 - h. Time schedules
 - i. Weather limitations
 - j. Manufacturer's written instructions
 - k. Warranty requirements
 - l. Compatibility of materials
 - m. Acceptability of substrates
 - n. Temporary facilities and controls
 - o. Space and access limitations
 - p. Testing and inspecting requirements
 - q. Installation procedures
 - r. Coordination with other work
 - s. Required performance results
 - t. Protection of adjacent work

1.7 REQUESTS FOR INFORMATION (RFI):

- A. Procedure: Immediately on discovery of the need for information or interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, the Contractor must prepare and submit an RFI in the form specified by the Resident Engineer.
 1. RFI must originate with the Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFI in a prompt manner to the Resident Engineer so as to avoid delays in Contractor's Work or Work of its subcontractors.
 3. RFI Log: The Contractor must prepare, maintain, and submit a tabular log of RFIs organized by the RFI number monthly to the Resident Engineer, or more frequently if directed by the Resident Engineer.
 4. On receipt of responses and action to the RFI, the Contractor must update the RFI log and immediately distribute the RFI response to affected parties. Review response(s) and notify the Resident Engineer immediately if the Contractor disagrees with response(s).



1.8 CORRESPONDENCE:

- A. Copies of all correspondence to DDC must be sent directly to the Resident Engineer at the job site.

1.9 CONTRACTOR'S DAILY REPORTS:

- A. The Contractor must prepare and submit Daily Construction Progress Reports as outlined in Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 31 00



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**SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required Work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for establishing an effective base line schedule for the Project and documenting the progress of construction during performance of the Work by developing and revising as necessary, various documents including but not limited to the following:
 - 1. Submittals schedule
 - 2. Daily construction reports
 - 3. Material location reports
 - 4. Field condition reports
 - 5. Special reports

- B. RELATED SECTIONS:

1. Section 01 10 00	SUMMARY
2. Section 01 32 22	PHOTOGRAPHIC DOCUMENTATION
3. Section 01 32 16.10	PROJECT SCHEDULES (METHOD A)
4. Section 01 32 16.20	PROJECT SCHEDULES (METHOD B)
5. Section 01 32 16.30	PROJECT SCHEDULES (METHOD C)
6. Section 01 33 00	SUBMITTAL PROCEDURES
7. Section 01 40 00	QUALITY REQUIREMENTS

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

- B. Design Consultant: "Design Consultant" must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.



PART II – PRODUCTS

2.1 SUBMITTALS SCHEDULE:

- A. Preparation: The Contractor must submit a schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates. The Submittals Schedule must show all of the following types of submittals:
1. Shop and Coordination Drawings
 2. Material Samples
 3. Catalog Cuts
 4. Test and Evaluation Reports
 5. Field Test Reports
 6. Sample Warranties
 7. Certificates
 8. Qualification Data
 9. Closeout Submittals
- B. Submittals: At the kick-off meeting, the Contractor must have a preliminary Submittals Schedule, and must review this Schedule with the Resident Engineer and the Design Consultant. Within ten (10) Days after the kick-off meeting, the Contractor must complete the Submittals Schedule, including all submission dates, required delivery dates, and fabrication times. The Contractor must include an updated Submittals Schedule with all Progress Payment applications.
- C. Review: The Resident Engineer will review the Submittals Schedule submitted by the Contractor. Upon acceptance, the Resident Engineer will date and sign the schedule as approved and transmit it to the Design Consultant, Contractor, and others within DDC as the Resident Engineer deems appropriate. If so directed by the Commissioner, the Contractor must revise the Submittals Schedule to indicate a submission date for specified shop drawings and/or material samples within sixty (60) Days after the kick-off meeting. The Contractor must resubmit the Submittals Schedule as necessary to include all review comments.

2.2 REPORTS:

- A. Daily Construction Reports: The Contractor must submit to the Resident Engineer written Daily Construction Reports at the end of each day that work was performed, recording basic information such as the date, day, weather conditions, and contract days passed, remaining contract duration/days and the following information concerning the Project.

Information: The reports must be prepared by the Contractor's Superintendent and must bear the Contractor's Superintendent's signature. Each report must contain the following information:

1. List name of Contractor, subcontractors, their work force in each category, and details of activities performed;
2. The type of materials and/or major equipment being installed by the Contractor and/or by each subcontractor;
3. The major construction equipment being used by the Contractor and/or subcontractors;
4. Material and Equipment deliveries;
5. High and low temperatures and general weather conditions;
6. Accidents;
7. Meetings and significant decisions;
8. Unusual events;
9. Stoppages, delays, shortages, and losses;
10. Meter readings and similar recordings;



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11. Emergency procedures;
12. Orders and/or requests of authorities having jurisdiction;
13. Approved Change Orders received and implemented;
14. Field Orders and Directives received and implemented;
15. Services connected and disconnected;
16. Equipment or system tests and startups;
17. Partial Completion(s) and occupancies; and,
18. Substantial Completion(s) authorized;

NOTE: If there is NO ACTIVITY at site, a daily report indicating so and the reason for no activity at the site must be submitted.

- B. Material Location Reports: The Contractor must submit a Material Location Report at weekly OR monthly intervals as determined and established by the Resident Engineer. Such report must include a comprehensive list of materials delivered to and stored at Project site. List must be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit a Request For Information (RFI) form with a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.3 SPECIAL REPORTS:

- A. Accident report, incident report, special condition report for the conditions out of control of any party involved with the Project effecting Project progress, explaining impact on the Project schedule and cost if any.

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 00



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**SECTION 01 32 16.10
PROJECT SCHEDULES (METHOD A)**

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.10

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 1. Methods
 2. Definitions
 3. Preliminary, Baseline, and Project Schedule Preparation Timeline
 4. Preliminary Project Schedule Development
 5. Project Schedule
 6. Activity and Calendar Coding Structure
 7. Work Breakdown Structure (WBS)
 8. Major Milestones
 9. Short (Three-Week) Interval/Two-Week Look-Ahead
 10. Submittals
 11. Project Schedule Updating
 12. Time Impact Analysis

1.3 METHODS:

- A. The Contractor must comply with Project schedule development and updating requirements as specified herein.
 1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with details of qualifications and experience of the proposed scheduling staff member(s).
 2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the precedence diagramming method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA) and American Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use the Contractor's



own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department’s P6 Enterprise license and develop the Progress Schedule within the Department’s Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.
4. The Contractor will be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:
 - a. The progress of work during that particular period of performance,
 - b. Any changes in schedule Logic,
 - c. The physical conditions that were used to update every Activities Percent Complete,
 - d. Any change in actual Start and Finish Dates,
 - e. Any Duration changes,
 - f. Any added and deleted Activities, and
 - g. Any added Extra Work (e.g. change orders).

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a Project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
Duration	The amount of time, in workdays, an Activity will take to perform.



<u>Term</u>	<u>Definition</u>
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a Project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.
Project Schedule	The Contractor's schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.



<u>Term</u>	<u>Definition</u>
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays as much as possible and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, Progress Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any has occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day in the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

- A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City’s acceptance as follows:
 1. The preliminary Project Schedule must be submitted no later than fifteen (15) Days after NTP.
 2. The initial submittal of the Baseline Schedule must be provided to the City for review no later than thirty (30) Days after NTP.



3. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than sixty (60) Days after NTP to ensure that the Baseline Schedule is accepted. The sixty (60) Days must include fourteen (14) Days review times for each submittal of the Baseline Schedule.
4. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

- A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CSI) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.
 1. All Activities for Contractor mobilization, procurement, and construction Activities within the first sixty (60) Days, including permits and submittals. All remaining work forecasted after the first sixty (60) Days must be summarized through the Contract's completion date.
 2. All submittal and procurement Activities for long lead items.
 3. The Project's Critical Path.
 4. An electronic copy of the schedule in either MS Project (.MPP) or Primavera P6 Professional Format (.XER).
- B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.

1.7 PROJECT SCHEDULE:

- A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete the Work.
- C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.
- E. All delay claims must be based on the current approved updates of the Project Schedule.
- F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.
- G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following items:



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1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
 2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
 3. Deliveries of owner-furnished equipment and/or materials.
 4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
 5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
 6. Performance of tests, submission of test reports, and approval of test results.
 7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
 8. Completion dates of all items required for phased completion (if applicable).
 9. Completion dates of all items required for Substantial Completion.
 10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
 11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
 12. Any additional detail requested by the Commissioner.
- H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) Work Days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc., may exceed twenty (20) Work Days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.
- I. Activity descriptions must use plain language that clearly and uniquely defines each Activity. Each description must include a verb or work function (e.g. submit, form, pour, etc.), an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.
- J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activity in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.
- K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.
- L. Float or slack, in any schedule, must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.
- M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not, in any way, affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.
- N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.



- O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition, the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above-noted submittals.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

- A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.
- B. Activity ID and Calendar Coding
 - 1. The Contractor’s proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.
- C. Activity ID Coding
 - 1. All Activities/ Resources/ Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/ Enterprise Level) to facilitate selection, sorting and preparation of reports.
 - 2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:

Activity Code	Meaning
RESP	<u>Responsibility</u> : Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	<u>Phase</u> : Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	<u>Location</u> : Breakdown by floor or elevation.
AREA	<u>Area</u> : Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	<u>Trade</u> : Breakdown by CSI Code or section number in the Specifications.

- a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.
- b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.



3. Project Calendar Coding
 - a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

- A. Structure must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:
 1. LEVEL 01 – The Project Level.
 2. LEVEL 02 – Contains a minimum of four (4) nodes: Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.
 3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This level must target specific, tangible, deliverable scopes of Project Work.
- B. The Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS Structure must be incorporated into the Baseline and Project Schedule.

1.10 MAJOR MILESTONES:

- A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work and maintained to represent the progress of the Project.

1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

- A. On a bi-weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic files and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.
- B. Each task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

- A. General
 1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.
 2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.
 3. The Contractor must provide all submittals in electronic format and two hard copies.
- B. Preliminary Project Schedule



1. For acceptance of the preliminary Project Schedule, the Contractor must submit the following:
 - a. Two (2) 11" x 17" hard copies of the proposed preliminary Project Schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.
 - b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:
 - i. The proposed WBS;
 - ii. All proposed Project Calendars;
 - iii. All proposed Activity Codes, clearly defined;
 - iv. The proposed Activity ID format; and
 - v. Schedule basis narrative, which must memorialize assumptions made in the development of the schedule.

C. Baseline Schedule

1. The City will normally return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.
2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.
3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:
 - a. A description of the Project scope and how the Work is represented in the schedule Activities;
 - b. A description of the overall sequence of major components of Work;
 - c. Planned work week for each definable feature of work;
 - d. Description of the Critical Path and near Critical Paths;
 - e. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-work days;
 - f. How regulatory, operational or third-party constraints are accommodated in the schedule;
 - g. Description of key Project coordination points or events;
 - h. Discussion of long lead items and basis of time frames for submittals; and
 - i. Potential opportunities and risks, including quantification of the schedule reduction or expansion.

D. Project Schedule Updates

1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives are to be submitted in hard copy, as well as in the native electronic format, as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera and MS Word and/or Adobe Acrobat for Narrative and supporting document submittals).



Department of Design and Construction

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:
 - a. The Contractor must furnish two (2) 11" x 17" color hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format with the initial and final schedule update submission.
 - b. An Activity bar chart Layout grouped by Activity Code and then sorted by Start Date, Finish Date, and then Total Float.
 - c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).
 - d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.
3. The City may request additional standard P6 reports from time to time at no additional cost.
4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:
 - a. Any changes to the schedule basis narrative;
 - b. Overall health of the Project;
 - c. Actual Activity Start Dates;
 - d. Actual Activity Finish Dates;
 - e. The physical conditions that were used to update Activities percent complete;
 - f. Percent of Work reported in place;
 - g. A description of the overall sequence of major components of Work;
 - h. Description of the Critical Path and near Critical Paths;
 - i. Description of key Project coordination points or events;
 - j. Discussion of long lead items and basis of time frames for submittals;
 - k. Potential opportunities and risks, including quantification of the schedule reduction or expansion;
 - l. Assumptions/exclusions made in the schedule;
 - m. Contract and Milestone completion date status:
 - i. Number of Days ahead or behind schedule and; and
 - ii. Days lost/gained compared with the previous update.
 - n. Lookahead report listing each Activity in the CPM schedule that is scheduled to be performed during the next reporting period;
 - o. Changes in Activity description, Logic, or Duration must be submitted as a separate Proposed Schedule and approved by the City prior to being submitted as an official update. Once allowed, said changes must be grouped and organized in the report in a manner that communicates in detail the rationale associated with each change and



the impact upon construction sequence, relationships and the Critical Path. A standard Digger Report is not sufficient to meet this requirement;

- p. Added/deleted Activities and the rationale associated with each action;
- q. Pending issues and status of other items;
- r. Permits;
- s. Contract modifications; and
- t. Extra Work, including change orders.

1.13 PROJECT SCHEDULE UPDATING:

- A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.
- B. Subsequent updates of the Project Schedule must be submitted monthly until Substantial Completion. The schedule Data Date must be the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.
- C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.
- D. The City may request meetings with the Contractor to review the Project Schedule and narrative and jointly verify Project health and information.
- E. In addition, the City may request meetings with the Contractor's scheduling representative to:
 - 1. Resolve out-of-sequence Logic.
 - 2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.
 - 3. Assess the impact, if any, of any pending change orders.
 - 4. Incorporate accepted time extensions.
 - 5. Review revised Logic (as-built and projected) and changes in Activity Duration, cost, and labor hours assigned.
- F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.
- G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor, and as a result the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:
 - 1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.



2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.
 3. Reschedule Activities to achieve maximum practical concurrence of accomplishment of Activities and comply with the revised schedule.
 4. Submit to the City for review a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule.
 5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.
- H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/ Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.
- I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City. The Recovery Schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.
- J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.

1.14 TIME IMPACT ANALYSIS:

- A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.
- B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.10



**SECTION 01 32 16.20
PROJECT SCHEDULES (METHOD B)**

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.20

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Methods
 - 2. Definitions
 - 3. Preliminary, Baseline, and Project Schedule Preparation Timeline
 - 4. Preliminary Project Schedule Development
 - 5. Project Schedule
 - 6. Activity and Calendar Coding Structure
 - 7. Work Breakdown Structure (WBS)
 - 8. Major Milestones
 - 9. Short (Three-Week) Interval/Two-Week Look-Ahead
 - 10. Submittals
 - 11. Project Schedule Updating
 - 12. Time Impact Analysis

1.3 METHODS:

- A. The Contractor must comply with Project schedule development and updating requirements as specified herein.
 - 1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with qualifications and experience of the proposed scheduling staff member(s).
 - 2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the Precedence Diagramming Method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA) and American Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use



the Contractor’s own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department’s P6 Enterprise license and develop the Progress Schedule within the Department’s Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.
4. The Contractor will be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:
 - a) The progress of work during that particular period of performance;
 - b) Any changes in schedule Logic;
 - c) The physical conditions that were used to update every Activities Percent Complete;
 - d) Any change in actual Start and Finish Dates;
 - e) Any Duration changes;
 - f) Any added and deleted Activities; and,
 - g) Any added Extra Work (e.g., change orders).

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a Project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
Duration	The amount of time, in workdays, an Activity will take to perform.



<u>Term</u>	<u>Definition</u>
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement, and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a Project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.
Project Schedule	The Contractor's schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.



<u>Term</u>	<u>Definition</u>
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays as much as possible and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any have occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day on the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

- A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City’s acceptance as follows:



1. Submit the Contractor's CPM Scheduler's qualifications to the City for approval within seven (7) Days after NTP. The City will respond to the submittal within seven (7) Days of the submittal receipt.
2. The preliminary Project Schedule must be submitted no later than twenty-one (21) Days after NTP.
3. The initial submittal of the Baseline Schedule must be provided to the City for review no later than forty-five (45) Days after NTP.
4. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than seventy-five (75) Days after NTP to ensure that the Baseline Schedule is accepted no later than ninety (90) Days after the NTP. The ninety (90) Days must include fourteen (14) Days review time by the City for each submittal of the Baseline Schedule.
5. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.

B. Remedies

1. Preliminary Project Schedule: The City will take a credit of three thousand dollars (\$3,000) if the preliminary Project Schedule is not submitted within twenty-one (21) Days of the NTP.
2. Acceptable Baseline Schedule: The City will take a credit of five thousand dollars (\$5,000) if an acceptable Baseline Schedule is not submitted within ninety (90) Days of the NTP.
3. Monthly Progress Schedule updates: The City will take a credit of two thousand dollars (\$2,000) for each schedule update not submitted within the period it was due.
4. Scheduling Firm Services: If an acceptable Baseline Schedule is not provided by the Contractor within ninety (90) Days of the NTP or three (3) updates are not provided by the Contractor during the period they are due, the City may engage the services of a scheduling firm to develop a Project schedule or update an existing schedule. The total cost of such services will be deducted from the monies due to the Contractor.
 - a. Any schedules and updates developed by such scheduling firm are for the City's sole use and do not, in any way, represent an acceptance of responsibility by the City to schedule the Work or relieve the Contractor of the obligation to complete the Work within the Durations specified by the Contract.
5. The City will only accept the submitted information after all corrections have been made and all issues have been resolved. The City may find the Contractor in default if items required by this Section are incomplete.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

- A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CSI) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.
- B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.



1.7 PROJECT SCHEDULE:

- A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all of the Work.
- C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.
- E. All delay claims must be based on the current approved updates of the Project Schedule.
- F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.
- G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following items :
 - 1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
 - 2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
 - 3. Deliveries of owner-furnished equipment and/or materials.
 - 4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
 - 5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
 - 6. Performance of tests, submission of test reports, and approval of test results.
 - 7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
 - 8. Completion dates of all items required for phased completion (if applicable).
 - 9. Completion dates of all items required for Substantial Completion.
 - 10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
 - 11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
 - 12. Any additional detail requested by the Commissioner.



- H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) work days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc., may exceed twenty (20) work days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.
- I. Activity descriptions must use plain language that clearly and uniquely define each Activity. Each description must include a verb or work function (e.g. submit, form, pour etc.) an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.
- J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activities in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.
- K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.
- L. Float or slack in any schedule must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.
- M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not in any way affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.
- N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.
- O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition, the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above noted submittals.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

- A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.
- B. Activity ID and Calendar Coding
 - 1. The Contractor's proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.



C. Activity ID Coding

1. All Activities/Resources/Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/Enterprise Level) to facilitate selection, sorting and preparation of reports.
2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:

Activity Code	Meaning
RESP	<u>Responsibility</u> : Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	<u>Phase</u> : Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	<u>Location</u> : Breakdown by floor or elevation.
AREA	<u>Area</u> : Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	<u>Trade</u> : Breakdown by CSI Code or section number in the Specifications.

- a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.
 - b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.
3. Project Calendar Coding
- a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

- A. A multi-level hierarchal WBS must be incorporated in all P6 schedules. An initial, proposed WBS must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:
1. LEVEL 01 – The Project Level.
 2. LEVEL 02 – Contains a minimum of four (4) nodes; Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.
 3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This level must target specific, tangible, deliverable scopes of the Project Work.
- B. The Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS must be incorporated into the Baseline and Project Schedule.



1.10 MAJOR MILESTONES:

- A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work packages and maintained to represent the progress of the Project.

1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

- A. On a bi-weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic files and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.
- B. Each Task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

- A. General
 - 1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.
 - 2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.
 - 3. The Contractor must provide all submittals in electronic format and two hard copies.
- B. Preliminary Project Schedule
 - 1. For acceptance of the preliminary Project Schedule the Contractor must submit the following:
 - a. Two (2) 11" x 17" hard copies of the proposed preliminary Project schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.
 - b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:
 - i. The proposed WBS;
 - ii. All proposed Project Calendars;
 - iii. All proposed Activity Codes, clearly defined;
 - iv. The proposed Activity ID format; and
 - v. Schedule basis narrative, which must memorialize assumptions made in the development of the schedule.
- C. Baseline Schedule
 - 1. The City will return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of



comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.

2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.
3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:
 - a. A description of the Project scope and how the Work is represented in the schedule Activities;
 - b. A description of the overall sequence of major components of Work;
 - c. Planned work week for each definable feature of work;
 - d. Description of the Critical Path and near Critical Paths;
 - e. Basis of Durations, described in terms of quantity and production rate;
 - f. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-Work Days;
 - g. How regulatory, operational or third-party constraints are accommodated in the schedule;
 - h. Description of key Project coordination points or events;
 - i. Discussion of long lead items and basis of time frames for submittals;
 - j. Description of anticipated means and methods for large quantity production Activities; and,
 - k. Potential opportunities and risks, including quantification of the schedule reduction or expansion.

D. Project Schedule Updates

1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives are to be submitted in hard copy, as well as in the native electronic format, as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera schedule files and MS Word and/or Adobe Acrobat for Narrative and supporting document submittals).
2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:
 - a. The Contractor must furnish two (2) 11" x 17" hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format, with the initial and final schedule update submission.
 - b. An Activity bar chart layout grouped by Activity Code and then sorted by Start Date, Finish Date, and then Total Float.
 - c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).



- d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.
3. The City may request additional standard P6 reports from time to time at no additional cost.
4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:
 - a. Any changes to the schedule basis narrative
 - b. A discussion of progress through the update period and status of the Project with respect to completion of the schedule. The progress reporting must detail work Activities that relate to the Project's Critical Path and if these Activities are progressing as planned.
 - c. A discussion of changes, delays or other circumstances affecting Progress including identified risks and opportunities and the Contractor's strategy.
 - d. A listing and brief explanation of modifications to the previously submitted network including Logic changes and Activity additions, deletions or modifications.
 - e. An update on the status of long lead items and whether the item is on the Critical Path.
 - f. The Contractor must report on all out of sequence Activities, the cause of this deviation to plan, and the proposed resolution of this issue.
 - g. The Contractor must include an explanation of assumptions and exclusions made in developing the schedule update and narrative.
5. The Contractor must provide a copy of the computer file(s) in electronic format or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files and an electronic copy of the Narrative Report.

1.13 PROJECT SCHEDULE UPDATING:

- A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.
- B. Subsequent updates of the Project Schedule must be submitted monthly until Substantial Completion. The schedule data date must be the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.
- C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.
- D. The City may request meetings with the Contractor to review the Project Schedule and Narrative and jointly verify Project health and information.
- E. In addition, the City may request meetings with the Contractor's scheduling representative to:
 1. Resolve out-of-sequence Logic;
 2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.
 3. Assess the impact, if any, of any pending change orders.
 4. Incorporate accepted time extensions.



5. Review revised Logic (as-built and projected) and changes in Activity Duration, cost, and labor hours assigned.
- F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.
- G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor and, as a result, the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:
 1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.
 2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.
 3. Reschedule Activities to achieve maximum practical concurrence of accomplishment of Activities and comply with the revised schedule.
 4. Submit to the City for review a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule.
 5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.
- H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/ Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.
- I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City.
 1. The recovery schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.
 2. The Recovery Schedule must be resource-loaded with manpower and equipment required to bring the date for Substantial Completion back into compliance.
- J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.



1.14 TIME IMPACT ANALYSIS:

- A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.
- B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.20



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

(No Text on This Page)



**SECTION 01 32 16.30
PROJECT SCHEDULES (METHOD C)**

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.30

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Methods
 - 2. Definitions
 - 3. Preliminary, Baseline, and Project Schedule Preparation Timeline
 - 4. Preliminary Project Schedule Development
 - 5. Project Schedule
 - 6. Activity and Calendar Coding Structure
 - 7. Work Breakdown Structure (WBS)
 - 8. Major Milestones
 - 9. Short (Three-Week) Interval/Two-Week Look-Ahead
 - 10. Submittals
 - 11. Project Schedule Updating
 - 12. Time Impact Analysis

1.3 METHODS:

- A. The Contractor must comply with Project schedule development and updating requirements as specified herein.
 - 1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with qualifications and experience of the proposed scheduling staff member(s).
 - 2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the Precedence Diagramming Method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA), and American Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use the Contractor's own P6 license (whether single-user or Enterprise



license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department’s P6 Enterprise license and develop the Progress Schedule within the Department’s Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.
4. The Contractor must be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:
 - a) The progress of work during that particular period of performance;
 - b) Any changes in schedule Logic;
 - c) The physical conditions that were used to update every Activities Percent Complete;
 - d) Any change in actual Start and Finish Dates;
 - e) Any Duration changes;
 - f) Any added and deleted Activities; and
 - g) Any added Extra Work (e.g., change orders).

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.



<u>Term</u>	<u>Definition</u>
Duration	The amount of time, in workdays, an Activity will take to perform.
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement, and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.



<u>Term</u>	<u>Definition</u>
Project Schedule	The Contractor’s schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, or Progress Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any have occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.



<u>Term</u>	<u>Definition</u>
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day on the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

- A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City’s acceptance as follows:
 - 1. Submit the Contractor’s CPM Scheduler’s qualifications to the City for approval within seven (7) Days after NTP. The City will respond to the submittal within seven (7) Days of the submittal receipt.
 - 2. The preliminary Project Schedule must be submitted no later than twenty-one (21) Days after NTP.
 - 3. The initial submittal of the Baseline Schedule must be provided to the City for review no later than forty-five (45) Days after NTP.
 - 4. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than seventy-five (75) Days after NTP to ensure that the Baseline Schedule is accepted no later than ninety (90) Days after the NTP. The ninety (90) Days must include fourteen (14) Days review time by the City for each submittal of the Baseline Schedule.
 - 5. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.
- B. Remedies
 - 1. Preliminary Project Schedule: The City will take a credit of three thousand dollars (\$3,000) if the preliminary Project Schedule is not submitted within twenty-one (21) Days of the NTP.
 - 2. Acceptable Baseline Schedule: The City will take a credit of five thousand dollars (\$5,000) if an acceptable Baseline Schedule is not submitted within ninety (90) Days of the NTP.
 - 3. Monthly Progress Schedule updates: The City will take a credit of two thousand dollars (\$2,000) for each schedule update not submitted within the period it was due.
 - 4. Scheduling Firm Services: If an acceptable Baseline Schedule is not provided by the Contractor within ninety (90) Days of the NTP or three (3) updates are not provided by the Contractor during the period they are due, the City may engage the services of a scheduling firm to develop a Project schedule or update an existing schedule. The total costs of such services will be deducted from the monies due to the Contractor.
 - 5. Any schedules and updates developed by such scheduling firm are for the City’s sole use and do not, in any way, represent an acceptance of responsibility by the City to schedule the Work or relieve the Contractor of the obligation to complete the Work within the Durations specified by the Contract.



6. The City will only accept the submitted information after all corrections have been made and all issues have been resolved. The City may find the Contractor in default if items required by this Section are incomplete.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

- A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CSI) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.
- B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.

1.7 PROJECT SCHEDULE:

- A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete the Work.
- C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.
- E. All delay claims must be based on the current approved updates of the Project Schedule.
- F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.
- G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following, items:
 1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
 2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
 3. Deliveries of owner-furnished equipment and/or materials.
 4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
 5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
 6. Performance of tests, submission of test reports, and approval of test results.



7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
 8. Completion dates of all items required for phased completion (if applicable).
 9. Completion dates of all items required for Substantial Completion.
 10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
 11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
 12. Any additional detail requested by the Commissioner.
- H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) Work Days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc. may exceed twenty (20) Work Days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.
- I. Activity descriptions must use plain language that clearly and uniquely defines each Activity. Each description must include a verb or work function (e.g. submit, form, pour etc.), an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.
- J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activities in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.
- K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.
- L. Float or slack, in any schedule, must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.
- M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not, in any way, affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.
- N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.
- O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition,



the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above-noted submittals.

- P. The Contractor must provide a Cost Flow Projection (CFP) summary covering from NTP to Final Acceptance. The CFP summary must match the expected billings for each period of performance.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.7.Q

- Q. Schedule Cost and Resource Loading
 1. At the direction of the City, and at no additional cost to the City, a Project Schedule must be cost loaded within thirty (30) Days after acceptance of the Baseline Schedule.
 2. The Contractor must accurately load all Project Activities with direct field labor associated with the craft or trades required to complete that Activity. All labor must be noted in manhours required to complete the tasking. The Contractor must include in all Activities the hours required of for major pieces of equipment.
 3. All Resource ID's must have a unique identifier assigned by the Contractor, and approved by the City, so the Project-specific data can be separated from other data in the system.
 4. Cost loading must be accomplished by adding a single summary level cost loaded Activity in the Project Schedule. This Activity will allow initial generation and monthly updates of the planned value that is time-phased into monthly periods.
 5. The intent of the cost loading is to facilitate cost forecasting, tracking, and reporting of monthly cost projection. Every month, the cost loaded summary Activity must be updated with earned value for prior months and revised monthly forecast for future periods. If there is a significant difference between the actual cumulative monthly invoice and the cumulative planned value from the cost loaded Project Schedule for any reporting month, the Contractor must provide the City with the reason for variance in the schedule narrative.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

- A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.
- B. Activity ID and Calendar Coding
 1. The Contractor's proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.
- C. Activity ID Coding
 1. All Activities/Resources/Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/Enterprise Level) to facilitate selection, sorting and preparation of reports.
 2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:



Activity Code	Meaning
RESP	<u>Responsibility</u> : Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	<u>Phase</u> : Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	<u>Location</u> : Breakdown by floor or elevation.
AREA	<u>Area</u> : Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	<u>Trade</u> : Breakdown by CSI Code or section number in the Specifications.

- a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.
 - b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.
3. Project Calendar Coding
- a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

- A. A multi-level hierarchal WBS must be incorporated in all P6 schedules. An initial, proposed WBS must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:
 1. LEVEL 01 – The Project Level.
 2. LEVEL 02 – Contains a minimum of four (4) nodes: Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.
 3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This Level must target specific, tangible, scopes of the Project Work.
 4. LEVEL 04 – Decomposition of Level 03 Activities providing work package details that provide an understanding of the process to be used to execute the Project Work.
- B. The Contractor’s proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS must be incorporated into the Baseline and Project Schedule.

1.10 MAJOR MILESTONES:

- A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work and maintained to represent the progress of the Project.



1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

- A. On a weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.
- B. Each task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

- A. General
 - 1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.
 - 2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP), followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.
 - 3. The Contractor must provide all submittals in electronic format and two hard copies.
- B. Preliminary Project Schedule
 - 1. For acceptance of the preliminary Project Schedule, the Contractor must submit the following:
 - a. Two (2) 11" x 17" hard copies of the proposed preliminary Project Schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.
 - b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:
 - i. The proposed (WBS);
 - ii. All proposed Project Calendars;
 - iii. All proposed Activity Codes, clearly defined;
 - iv. The proposed Activity ID format; and
 - v. Schedule basis narrative, which must memorialize the assumptions made in the development of the schedule.
- C. Baseline Schedule
 - 1. The City will return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.
 - 2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.
 - 3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:



- a. A description of the Project scope and how the Work is represented in the schedule Activities;
 - b. A description of the overall sequence of major components of Work;
 - c. Planned work week for each definable feature of work.
 - d. Description of the Critical Path and near Critical Paths;
 - e. Basis of Durations, described in terms of quantity and production rate;
 - f. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-work days;
 - g. How regulatory, operational or third-party constraints are accommodated in the schedule;
 - h. Description of key Project coordination points or events;
 - i. Discussion of long lead items and basis of time frames for submittals;
 - j. Description of anticipated means and methods for large quantity production Activities;
 - k. Potential opportunities and risks, including quantification of the schedule reduction or expansion; and
 - l. Assumptions/exclusions made in the schedule.
- D. Project Schedule Updates
- 1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives must be submitted in hard copy and the native electronic format as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera schedule files and MS Word and/or Adobe Acrobat for narrative and supporting document submittals).
 - 2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:
 - a. The Contractor must furnish two (2) 11" x 17" hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format with the initial and final schedule update submission.
 - b. An Activity bar chart Layout grouped by Activity Code and then sorted by Start Date, Finish Date, and Total Float.
 - c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD), Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).
 - d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.
 - 3. The City may request additional standard P6 reports from time to time at no additional cost.
 - 4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:



- a. Any changes to the schedule basis narrative;
- b. Overall health of the Project;
- c. Actual Activity Start Dates;
- d. Actual Activity Finish Dates;
- e. The physical conditions that were used to update Activities percent complete
- f. Percent of Work reported in place;
- g. Contract and Milestone completion date status:
 - i. Number of Days ahead or behind schedule; and
 - ii. Days lost/gained compared with the previous update.
- h. Schedule change report organized by Milestone and area comparing the number of Activities that were planned to start and finish to the number that actually started and finished for the reporting period;
- i. Lookahead report listing each Activity in the CPM schedule that is scheduled to be performed during the next reporting period;
- j. Plans for executing scheduled Activities during the next reporting period;
- k. Analysis, organized by Milestone and area, of the Critical Path and near Critical Path(s) describing:
 - i. The nature of the Critical Path/near Critical Path;
 - ii. Impact on other Activities, Milestones and Finish dates; and
 - iii. Identify, or update, risks and opportunities that may impact the Critical Path/near Critical Paths.
- l. List of current and anticipated delays by Milestone:
 - i. Cause of the delay;
 - ii. Corrective actions and schedule adjustments to correct the delay;
 - iii. Impact of the delay on other Activities, Milestones and completion dates; and
 - iv. Weather delays, when applicable. The Contractor must describe how the impacts of weather conditions and constraints were absorbed and accounted for in the schedule.
- m. Changes in Activity description, Logic, or Duration must be submitted as a separate Proposed Schedule and approved by the City prior to being submitted as an official update. Once allowed, said changes must be grouped and organized in the report in a manner that communicates in detail the rationale associated with each change and the impact upon construction sequence, relationships and the Critical Path. A standard Digger Report is not sufficient to meet this requirement;
- n. Added/deleted Activities and the rationale associated with each action;
- o. Pending issues and status of other items;
- p. Permits;
- q. Contract modifications;
- r. Current and potential extra Work, including change orders;
- s. Status of long lead procurement items and whether the item is on the Critical Path;
- t. Status of Project submittals;



- u. Out of sequence report describing the necessity of each Activity relationship shown therein, as described within this Section;
- v. Illogical progress/restraint reports (if any);
- w. Other Project or scheduling concerns;
- x. Electronic copy of the latest CPM schedule update file in Primavera (.XER) format; and
- y. Primavera scheduling error report.

1.13 PROJECT SCHEDULE UPDATING:

- A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.
- B. Subsequent updates to the Project Schedule must be submitted monthly until Substantial Completion is achieved. The schedule Data Date must be set to the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.
- C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.
- D. The City may request meetings with the Contractor to review the Project Schedule and narrative and jointly verify Project health and information.
- E. In addition, the City may request meetings with the Contractor's scheduling representative to:
 - 1. Resolve out-of-sequence Logic.
 - 2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.
 - 3. Assess the impact, if any, of any pending change orders.
 - 4. Incorporate accepted time extensions.
 - 5. Review revised Logic (as-built and projected) and changes in Duration, cost, and labor hours assigned.
- F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.
- G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor, and as a result the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:
 - 1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.



2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.
 3. Reschedule Activities to achieve maximum resource utilization across the Project and comply with the revised schedule.
 4. Submit to the City a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule. The Contractor must promptly provide the necessary level of effort to bring the Work back on schedule.
 5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical, or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.
- H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.
- I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City. The Recovery Schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.
- J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.

1.14 TIME IMPACT ANALYSIS:

- A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.
- B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.30



**SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION**

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 33

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Photographic Media
 - 2. Construction Photographs
 - 3. Pre-construction Photographs
 - 4. Periodic Construction Progress Photographs
 - 5. Special Photographs
 - 6. DVD Recordings
 - 7. Final Completion Construction Photographs
- B. RELATED SECTIONS: include without limitation the following:
 - 1. Section 01 10 00 SUMMARY
 - 2. Section 01 33 00 SUBMITTAL PROCEDURES
 - 3. Section 01 35 91 HISTORIC TREATMENT PROCEDURES
 - 4. Section 01 78 39 CONTRACT RECORD DOCUMENTS
 - 5. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
- C. PHOTOGRAPHER - The Contractor must employ and pay for the services of a professional photographer who will take photographs showing the progress of the Work.

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SUBMITTALS:

- A. Qualification Data: For photographer.
- B. Key Plan: With each Progress Photograph Submittal include a key plan of Project site and building with notation of vantage points marked for location and direction of each image. Indicate location, elevation or story of construction. Include same label information as corresponding set of photographs.



- C. Construction Progress Photograph Prints: Take Progress Photographs bi-weekly and submit four (4) color prints of each photographic view for each trade to the Resident Engineer. Such Progress Photographs must be included in each monthly progress report or as otherwise directed by the Resident Engineer.
- D. Digital Files: Submit digital files in the format required.

1.5 QUALITY ASSURANCE:

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three (3) years.

1.6 COORDINATION:

- A. The Contractor and its subcontractor(s) must cooperate with the photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, such as temporary lighting required to produce clear and well-lit photographs without obscuring shadows.

1.7 COPYRIGHT:

- A. The Contractor must include the provisions of this Subsection 1.7 in the agreement between the Contractor and the Photographer who will provide the construction photographs described in this Section. The Contractor must submit to the Resident Engineer a copy of its agreement with the Photographer.
- B. Any photographs, images and/or other materials produced pursuant to this Agreement, and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to this Agreement, will, upon their creation, become the exclusive property of the City.
- C. Any photographs, images and/or other materials provided pursuant to this Agreement (“Copyrightable Materials”) will be considered “work-made-for-hire” within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City will be the copyright owner thereof and of all aspects, elements and components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as “work-made-for-hire,” the Photographer hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Photographer will retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials must be used by the Photographer for no purpose other than in the performance of this Agreement without the prior written permission of the City. The Department may grant the Photographer a license to use the Copyrightable Materials on such terms as determined by the Department and set forth in the license.
- D. The Photographer acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Photographer must fully cooperate in this effort and agrees to provide any and all documentation necessary to accomplish this.
- E. The Photographer represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright Law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Photographer has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Agreement, copies of which must be provided to the City.



PART II – PRODUCTS

2.1 PHOTOGRAPHIC MEDIA:

- A. Digital Images: Digital files must be captured as 7.2 megapixel files or greater, with a minimum pixel array of 2,400 pixels by 3,000 pixels. The camera used to capture the digital files must be a Digital SLR (Single Lens Reflex) camera or approved equal; “point and shoot” cameras or camera phones are not acceptable. Digital cameras must produce images using true optical resolution; “digital zoom” is not acceptable. Images must not be resized or interpolated. The file format for digital files must be Joint Photographic Experts Group format (“JPG”). The digital files must not be modified or processed in any way to alter the JPG file’s metadata, including the photograph’s original capture date.
- B. Digital Files: Digital files must be submitted on Digital Versatile Disk (“DVD”) or as specified by the Commissioner. DVDs must be inserted in standard weight Archival Quality clear poly sheet protectors and submitted in a hard cover three (3) ring binder. The information imprinted on each print must be provided on an Excel file included on the DVD. The DVD must be labeled with the Project ID and the Project description. Labeling using adhesive labels is not acceptable.
- C. Prints:
 - 1. Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte color prints on single-weight commercial-grade stock paper, with 1-inch wide margins and punched for standard 3-ring binder.
 - 2. Identification: On the front of each photograph affix a label in the margin with Project name and date photograph was taken. On the back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Project Contract I.D. Number.
 - b. Project Contract Name.
 - c. Name of Contractor. (and Subcontractor Trade Represented)
 - d. Subject of Image Taken.
 - e. Date and time photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction and other pertinent information.
 - g. Unique sequential identifier.
 - h. Name and address of photographer.

PART III – EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS:

- A. General: Take photographs that provide the largest possible depth-of-field while still in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location and direction of view.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in filename for each image.
 - 2. Field Office Images: Maintain one set of images on USB drive, or other electronic media requested by the Commissioner, in the field office at the Project site so that it is available at all times for reference. Ensure that the images are the same as for those submitted to Commissioner.

3.2 PRE-CONSTRUCTION & PRE-DEMOLITION PHOTOGRAPHS:

- A. Before commencement of Contract Work at the Project site, take color photographs of Project site and surrounding properties, including existing structures or items to remain during construction, from different vantage points, as directed by the Resident Engineer.
 - 1. Flag applicable excavation areas and construction limits before taking construction photographs.



2. Take photographs of minimum eight (8) views to show existing conditions adjacent to property before starting the Work.
 3. Take applicable photographs of minimum eight (8) views of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 4. Take additional photographs as required or directed by the Resident Engineer to record settlement or cracking of adjacent structures, pavements, and improvements.
- B. Demolition Operations: Take photographs as directed by the Resident Engineer of minimum of eight (8) views each before commencement of demolition operations, at mid-point of operations and at completion of operations.
- C. Pre-Demolition Photographs: Take archival quality color photographs, to include all exterior building facades, of all structures at the Project site designated to be fully demolished or removed in compliance with New York City Building Code requirements. Submit four (4) complete sets of pre-demolition photographs, in the format specified herein, to the Resident Engineer for submission to the New York City Department of Buildings.

3.3 PERIODIC CONSTRUCTION PROGRESS PHOTOGRAPHS:

- A. Take photographs of minimum eight (8) views bi-weekly as directed by the Resident Engineer of construction progress for each contract trade. Select vantage points to show status of construction and progress since last photographs were taken.

3.4 SPECIAL PHOTOGRAPHS:

- A. The photographer must take special photographs of subject matter or events as specified in other sections of the Project Specifications from vantage points specified or as otherwise directed by the Resident Engineer.
- B. Historical Elements: As required in Section 01 35 91 HISTORIC TREATMENT PROCEDURES, for Contract Work at designated landmark structures or sites, the photographer, as specified and required by individual sections of the Contract documents or at the direction of the Commissioner, must take images of existing elements scheduled to be removed for replacement, repair or replication in quantities as directed, including post-construction photographs of completed Work as directed by the Commissioner.
1. Take Presentation Quality Photographs of designated landmark structures as directed by the Commissioner for submission to the New York City Landmarks Preservation Commission. Provide a minimum of four (4) color photographic prints of each view as directed.

3.5 VIDEO RECORDING:

- A. When Video Recording of Demonstration and Orientation sessions is required, the Contractor must provide the services of a Videographer as indicated in Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

3.6 FINAL COMPLETION CONSTRUCTION PHOTOGRAPHS:

- A. For submission as Project Record Documents, take color photographs of minimum eight (8) unobstructed views of the completed Project and/or Project site, as directed by the Commissioner and after all scaffolding, hoists, shanties, field offices or other temporary work has been removed and final cleaning has been done after date of Substantial Completion. Submit four (4) sets of each view of Presentation Quality photographic prints, including negatives and/or digital images electronic file.

END OF SECTION 01 32 33



**SECTION 01 33 00
SUBMITTAL PROCEDURES**

PART I – GENERAL:

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Coordination Drawings, Catalogue Cuts, Material Samples, and other Submittals required by the Contract Documents.
- B. Review of Submittals does not relieve the Contractor of responsibility for any Contractor's errors or omissions in such Submittals, nor from responsibility for complying with the requirements of the Contract.
- C. Responsibility of the Contractor: The approval of Shop Drawings will be general and will not relieve the Contractor of the following responsibilities:
 - 1. Accuracy of such Shop Drawings;
 - 2. Proper fitting and construction of the Work
 - 3. Furnishing of materials or Work required by the Contract that may not be indicated on the Shop Drawings.
- D. Approval of Shop Drawings must not be construed as approving departures from the Contract Drawings, Supplementary Drawings, or Specifications.
- E. This Section includes the following:
 - 1. Definitions
 - 2. Submission Procedures
 - 3. Coordination Drawings
 - 4. LEED Submittals
 - 5. Ultra Low Sulfur Diesel Fuel Reporting
 - 6. Construction Photographs and Recordings
 - 7. As-Built Documents

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- D. Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION
- E. Section 01 40 00 QUALITY REQUIREMENTS
- F. Section 01 77 00 CLOSEOUT PROCEDURES
- G. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- H. Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS
- I. Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS
- J. Section 01 81 13.10 ENVIRONMENTALLY PREFERABLE PURCHASING (EPP) COMPLIANCE



1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and Specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Action Submittals: Written and graphic information, or physical samples that require responsive actions and include, without limitation, all Shop Drawings, product data, letters of certification, tests and other information required for quality control and as required by the Contract Documents.
- D. Informational Submittals: Written and graphic information that does not require responsive action. Informational Submittals may be rejected for non-compliance with the Contract.
- E. Shop Drawings: Drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, except for coordination drawings, specifically prepared for the Project by the Contractor or any subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the Work must be fabricated and/or installed.
- F. Coordination Drawings: As required in Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.
- G. Product Data and Quality Assurance Submittals: Includes manufacturer’s standard catalogs, pamphlets, and other printed materials including without limitation the following:
 - 1. Catalogue and Product specifications
 - 2. Installation instructions
 - 3. Color charts
 - 4. Catalog cuts
 - 5. Rough-in diagrams and templates
 - 6. Wiring diagrams
 - 7. Performance curves
 - 8. Operational range diagrams
 - 9. Mill reports
 - 10. Design data and calculations
 - 11. Certification of compliance or conformance
 - 12. Manufacturer’s instructions and field reports

1.5 COORDINATION DRAWINGS:

- A. Coordination Drawings, General: When coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity, or where limited space availability necessitates coordination, prepare Coordination Drawings according to requirements in individual Sections as a prerequisite to submittal of Shop Drawings.



1. Content: Project-specific information, shown accurately to a scale large enough to indicate and resolve conflicts. Do not base Coordination Drawings on standard printed data. Include the following information, as applicable for the Project:
 - a. Use applicable background views as a basis for preparation of coordination layouts. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information by multiple contractors in a sequence that best presents the information and resolution of conflicts between installed components, before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, plumbing, fire protection, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Commissioner indicating proposed resolution of such conflicts.

- B. Coordination Drawing Organization: Organize Coordination Drawings as follows:
 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling raised access floor and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide Coordination Drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 - d. HVAC equipment
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.



- e. Indicate runs and locations of Audio Visual and Information Technology, and security devices.
- 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- C. The Contractor must issue the completed Coordination Drawing(s) to the Design Consultant for his/her review. The Design Consultant may call as many meetings as necessary with the Contractor, including attendance by applicable subcontractors, and may call on the services of the applicable sub consultant(s) where necessary, to resolve any conflicts that become apparent.
- D. Upon resolution of any conflicts, the Contractor must provide a final Coordination Drawing(s) which will become the Master Coordination Drawing(s). The Master Coordination Drawing(s) must be signed and dated by the Contractor to indicate acceptance of the arrangement of the Work.
- E. A reproducible copy of the Master Coordination Drawing(s) must be provided by the Contractor to each of the appropriate subcontractor(s), the Resident Engineer and the Design Consultant for information.
- F. Shop Drawings must not be submitted prior to acceptance of the final coordinated drawings and must be prepared in accordance with the Master Coordination Drawing(s). No work will be permitted without accepted Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.
- G. Coordination Drawing Digital Data Files: Prepare coordination digital data files according to the following requirements:
 - 1. File Preparation Format: Same digital data software program, version, and operating system as original Design Drawings.
 - 2. File Submittal Format: Submit or post coordination drawing files using PDF format.
 - 3. BIM File Incorporation: Submit or post coordination drawing files using PDF format, unless otherwise directed by Commissioner.
 - 4. Commissioner will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Contractor must execute Digital Data File Release and indemnification form provided by Commissioner.
 - b. Commissioner makes no representations as to the accuracy or completeness of digital data files as they relate to coordination drawings.

1.6 SUBMITTAL PROCEDURES:

- A. Refer to Section 01 35 03 GENERAL MECHANICAL REQUIREMENTS and Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS for additional Submittal requirements involving electrical and mechanical work or equipment of any nature called for in the Project.
- B. Coordination: Coordinate preparation and processing of Submittals with performance of construction activities.
 - 1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activities, with the Submittal Schedule specified in Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION.
 - 2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
 - 3. The Commissioner reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.
- C. Identification: Place a permanent label or title block on each Submittal for identification.



1. Indicate name of firm or entity that prepared each Submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Consultant.
 3. Include the following minimum information on label for processing and recording action taken:
 - a. Project name, DDC Project Number, and Contract Number
 - b. Date
 - c. Name and address of Design Consultant
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Submittal number or other unique identifier, including revision identifier
 - i. Number and title of appropriate Specification Section
 - j. Drawing number and detail references, as appropriate
 - k. Location(s) where product is to be installed, as appropriate
 - l. Other necessary identification
- D. PDF Submittals:
1. Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number. Bind transmittal form with each submittal file package. Transmittal form must be the first page in the PDF file constituting the submittal.
 2. Submittal files received from sources other than the Contractor will be rejected without review. Re-submission of the same drawings or product data must bear the original number of the prior submission and the original titles.
- E. Web-Based Project Software Submittals: Prepare submittals as PDF files, or other format indicated by Project software website.
- F. Transmittal Form: Provide locations on form for the following information:
1. Project name, DDC Project number and Contract Number
 2. Date
 3. Destination (To:)
 4. Source (From:)
 5. Names of Contractor, subcontractor, manufacturer, and supplier
 6. Category and type of Submittal
 7. Submittal purpose and description
 8. Specification Section number and title
 9. Drawing number and detail references, as appropriate
 10. Transmittal number, numbered consecutively
 11. Submittal and transmittal distribution record
 12. Remarks
 13. Signature of transmitter
- G. Shop Drawings:
1. Procedures for Preparing, Forwarding, Checking, and Returning all Shop Drawings must be, generally, as follows:
 - a. The Contractor must make available to its subcontractors the necessary Contract Documents and must instruct such subcontractor to determine dimensions and conditions in the field, particularly in reference to coordination between the trade subcontractors. The Contractor must direct its subcontractors to prepare Shop Drawings for submission to the Design



Consultant in accordance with the requirements of these General Conditions. The Contractor must also direct its subcontractors to "Ring Up" corrections made on all re-submissions for approval, so as to be readily seen, and that the appropriate symbol per item 2 below (e.g., "GC") be used to identify the source of the correction or information that has been added.

The Contractor must:

1. Review and be responsible for information shown on its subcontractor's Shop and Installation Drawings and manufacturers' data, and conformity to Contract Documents.
 2. "Ring Up" corrections made on all submissions for approval, so as to be readily seen, and that the symbol "GC", "PL", "HVAC", or "EL" be used to indicate that the correction and/or information added was made by the Contractor and/or its subcontractor(s).
 3. Clearly designate which entity is to perform the Work when the term, "work by others" or other similar phrases are indicated on the Contract Drawings before submission to the Design Consultant.
 4. Stamp submissions "Recommended for Acceptance", date and forward to the Design Consultant.
2. The Contractor must promptly prepare and submit project specific layout detail and Shop Drawings of such parts of the Work as are indicated in the Specifications, or as required. These Shop Drawings must be made in accordance with the Contract Drawings, Specifications and Supplementary Drawings, if any. The Shop Drawings must be accurate and distinct and give all the dimensions required for the fabrication, erection, and installation of the Work.
 3. Size of Drawings: The Shop Drawings, unless otherwise directed, must be on sheets of the same size as the Contract Drawings, drawn accurately and of sufficient scale to be legible, with a one half (1/2) inch marginal space on each side and a two (2) inch marginal space for binding on the left side.
 4. Scope of Drawings: Shop Drawings must be numbered consecutively and must accurately and distinctly represent all aspects of the Work, including without limitation the following:
 - a. All working and erection dimensions
 - b. Arrangements and sectional views
 - c. Necessary details, including performance characteristics and complete information for making necessary connections with other Work
 - d. Kinds of materials including thickness and finishes
 - e. Identification of products
 - f. Fabrication and installation drawings
 - g. Roughing-in and setting diagrams
 - h. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
 - i. Shop work manufacturing instructions
 - j. Templates and patterns
 - k. Schedules
 - l. Design calculations
 - m. Compliance with specified standards
 - n. Notation of coordination requirements
 - o. Notation of dimensions established by field measurement
 - p. Relationship to adjoining construction clearly indicated
 - q. Seal and signature of professional engineer if specified
 - r. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring
 - s. All other information necessary for the Work and/or required by the Commissioner
 5. Titles and Reference: Shop Drawings must be dated and contain:
 - a. Name of the Project, DDC Project Number, and Contract Number
 - b. The descriptive names of equipment or materials covered by the Contract Drawings and the classified item number or numbers.



- c. The locations or points and sequence at which materials, or equipment, are to be installed in the Work
 - d. Cross references to the section number, detail number, and paragraph number of the Contract Specifications
 - e. Cross references to the sheet number, detail number, etc., of the Contract Drawings
6. Field Measurements: In addition to the above requirements, the Shop Drawings must be signed by the Contractor and, if applicable, the subcontractor responsible for preparation of the Shop Drawings. Each Shop Drawing must be stamped with the following wording:

FIELD MEASUREMENTS: The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, which said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.
7. Contractor's Statement with Submittal: Any Submittal by the Contractor for acceptance, including without limitation, all dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the Work or any part thereof, must be accompanied by a statement that the Submittal has been examined by the Contractor and that everything shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If there is any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, the Contractor must, in its statement, list and clearly describe each discrepancy.
8. Acceptance will be given based upon the Contractor's representation that what is shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If the Contractor's statement indicates any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, such change is subject to review and prior written acceptance by the Design Consultant. In addition, such change may require a change order in accordance with Article 25 of the Contract. In the event any such change is approved, any additional expense or increased cost in connection with the change is the sole responsibility of the Contractor.
9. Submission of Shop Drawings:
 - a. Initial Submission: The Contractor must submit seven (7) copies, or as requested by the Resident Engineer, of each Shop Drawing to the Design Consultant for his/her review and acceptance. If PDF drawings are requested by the Resident Engineer, they must be provided in an original "printed from digital" format, and not scanned. The Design Consultant will transmit Shop Drawings to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory Shop Drawing will be digitally stamped "No Exceptions Taken", be dated and transmitted by the Design Consultant as follows:
 - 1) Addressed to the Contractor, with a cc to the following:
 - a) Design Consultant's sub consultant(s) as appropriate
 - b) DDC
 - 2) Should the Shop Drawing(s) be "Rejected" or noted "Revise and Resubmit" by the Design Consultant, the Design Consultant will transmit the Shop Drawings to the Contractor with the necessary corrections and changes to be made as indicated thereon.



- b. Revisions: The Contractor must make such corrections and changes and again transmit each shop drawing to the Design Consultant. The Contractor must revise and resubmit the Shop Drawing as required by the Design Consultant until the Shop Drawings are stamped "No Exceptions Taken". However, Shop Drawings which have been stamped "Make Corrections Noted" will be considered an "Acceptable" Shop Drawing and NEED NOT be resubmitted.
- c. Commencement of Work: No Work or fabrication called for by the Shop Drawings must be done until the acceptance of the said drawings by the Design Consultant is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractor's subcontractors which Shop Drawing indicated Work related to, adjacent to, impinging upon, or affecting Work to be done by other subcontractors must be transmitted to the subcontractors so affected. [These accepted Shop Drawings must be distributed to the affected subcontractors when required with a copy of the transmittal to the Resident Engineer.]
- d. Variations: If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor must make specific mention of such variations in its letter of Submittal. Acceptance of the Shop Drawings must constitute acceptance of the subject matter thereof only and not of any structural apparatus shown or indicated.

H. Product Data:

- 1. General: Except as otherwise prescribed herein, the submission, review, and acceptance of Product Data and Catalogue cuts must conform to the procedures specified in subsection 1.6 E, Shop Drawings.
- 2. If information must be specially prepared for the Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
- 3. Mark each copy of the Submittal to show which products and options are applicable.
- 4. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- 5. Submit Product Data before or concurrent with Samples.
- 6. Submission of Product Data:
 - a. Initial Submission: The Contractor must submit seven (7) sets of Product Data to the Design Consultant for his/her review and acceptance. The Design Consultant will transmit Product Data to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory catalogue cut will be digitally stamped "No Exception Taken", be dated and transmitted as follows:



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- 1) Addressed to the Contractor, with a cc to the following:
 - a) Design Consultant's sub consultant(s) as appropriate
 - b) DDC
- 2) Should the Product Data be "Rejected" or noted "Revise and Resubmit" by the Design Consultant, the Design Consultant will return one (1) set of such Product Data to the Contractor with the necessary corrections and changes to be made indicated and one (1) set to DDC.
7. Revisions: The Contractor must make such corrections and changes and again submit seven (7) copies of each Product Data for the review of the Design Consultant. The Contractor must revise and resubmit the Product Data as required by the Design Consultant until the submission is stamped "No Exceptions Taken" by the Design Consultant. However, Product Data which has been stamped "Make Corrections Noted" must be considered an "Accepted" Product Data and NEED NOT be resubmitted.
- I. Samples of Materials:
 1. For samples of materials involving electrical Work of any nature, refer to Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS.
 2. Samples must be in triplicate or as directed by the Resident Engineer, and of sufficient size to show the quality, type, range of color, finish and texture of the material.
 3. Each of the samples must be labeled as follows:
 - a. Name of the Project, DDC Project Number and Contract Number
 - b. Name and quality of the material
 - c. Date
 - d. Name of Contractor, subcontractor, manufacturer and supplier
 - e. Related Specification or Contract Drawing reference to the samples submitted
 4. A letter of transmittal, in triplicate, from the Contractor requesting acceptance must accompany all such samples.
 5. Transportation charges to the Design Consultant's office must be prepaid on all samples forwarded.
 6. Samples for testing purposes must be as required in the Specifications.
 7. Samples on Display: When samples are specified to be equal to approved product, they must be carefully examined by the Contractor and by those whom the Contractor expects to employ for the furnishing of such materials.
 8. Timely Submissions Log/Schedule: Samples must be submitted in accordance with approved Shop Drawing log so as to permit proper consideration without delaying any operation under the Project. Materials should not be ordered until acceptance is received, in writing, from the Design Consultant. All materials must be furnished equal in every respect to the accepted samples.
 9. The acceptance of any samples will be given as promptly as possible, and will be only for the characteristic color, texture, strength, or other feature of the material named in such acceptance, and no other. When this acceptance is issued by the Design Consultant, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Specifications, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equal to the approved samples and complies in every respect with the Specifications, and the colors and textures of the samples on file in the office of the Design Consultant, for the Project.



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10. Acceptability of test Data: The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.
 11. Valuable Samples: Valuable samples, such as hardware, plumbing and electrical fixtures, etc., not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the Work after all questions of acceptability have been settled, providing suitable permanent records are made as to the location of the samples, their properties, etc.
- J. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- K. Supplementary Qualification Data: Prepare written information that demonstrates capabilities and experience of entity. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- L. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- M. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS formats. Include names of firms and personnel certified.
- N. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.



2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.
- O. Equivalent Quality: Any material, article and/or equipment which is designated in the Drawings and/or Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name is designated for the purpose of describing the material, article and/or equipment and fixing the standard of performance and/or function, as well as the quality and/or finish. Any material, article and/or equipment which is other than what is specified in the Drawings and/or Specifications will only be accepted if the Commissioner makes a written determination that such material, article and/or equipment is equivalent to that which is specified in the Drawings and/or Specifications.
- P. The submission of any material, article and/or equipment as the equal of any material, article and/or equipment set forth in the Drawings and/or Specifications as a standard must be accompanied by any and all information essential for determining whether such proposed material, article and/or equipment is equivalent to that which is specified. Such information must include, without limitation, illustrations, drawings, descriptions, catalogues, records of tests, samples, as well as information regarding the finish, durability and satisfactory use of such proposed material, article and/or equipment under similar operating conditions.
- Q. Engineering Services Submittals:
1. Performance and Design Criteria: Refer to Section 01 40 00 QUALITY REQUIREMENTS, Article 1.5.
 2. Engineering Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three paper copies of certificate, signed and sealed by the responsible professional engineer, for each product and system specifically required of the Contractor to be designed or certified by a professional engineer.
 - a. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
 3. BIM Incorporation: Incorporate engineering services drawing and data files into BIM established for



Project.

- a. Prepare engineering services documents in the required formats, including BIM incorporation.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.7

1.7 LEED SUBMITTALS:

- A. Comply with Submittal requirements specified in the following sections:
 1. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL;
 2. Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or
Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS, as applicable;
 3. Section 01 81 13.13 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS;
 4. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS;
 5. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS; and/or,
 6. Section 01 91 15 BUILDING ENCLOSURE COMMISSIONING REQUIREMENTS.
- B. LEED Building Submittal information must be assembled into one package per each applicable Specification Section, separate from all other non-LEED Submittals. Each Submittal package must have a separate transmittal and identification as described in Subsection 1.5 herein.
- C. Number of Copies: Submit four (4) copies of LEED Submittals, in accordance with procedure described in Article 1.5 herein, unless otherwise indicated.
- D. Material Safety Data Sheets (MSDSs) for LEED Certification: Submit information necessary to show compliance with LEED certification requirements, which will be the limit of the Design Consultant's review for LEED compliance.
 1. Designated LEED Submittals that include non-LEED MSDS data will not be reviewed. The entire Submittal will be returned for re-submission.
- E. Product Cut Sheets and/or Shop Drawings for LEED Certification: Provide product cut sheets and/or shop drawings with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project. For detailed requirements refer to Subsection 1.6 of Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 PROJECTS, or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
 1. Provide the quantity, length, area, volume, weight, and/or cost of each product submitted as required to satisfy LEED documentation requirements. Refer to Subsection 1.6 of Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 PROJECTS.

1.8 ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING:

- A. In accordance with Section 01 10 00 SUMMARY, Subsection 1.10 E, the Contractor must submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel and Best Available Technology (BAT) in Non road Vehicles. Submission of such reports must be in accordance with the schedule, format, directions and procedures established by the Commissioner.



1.9 CONSTRUCTION PHOTOGRAPHS AND VIDEO RECORDINGS:

- A. Submit construction progress photographs and Video recordings in accordance with requirements of Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.

1.10 AS-BUILT DOCUMENTS:

- A. Submit all as-built documents in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 33 00



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**SECTION 01 35 03
GENERAL MECHANICAL REQUIREMENTS**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 35 03

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. The General Mechanical Requirements contained herein must be followed by the Contractor, as well as its subcontractor for HVAC work. This Section sets forth the General Requirements applicable to mechanical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Specifications and/or the Contract Drawings, whichever requirement is the most stringent must take precedence.

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS
- D. Section 01 42 00 REFERENCES
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. **CONCEALED PIPING AND DUCTS:** piping and ducts hidden from sight in masonry or other construction, in floor fill, trenches, partitions, hung ceilings, furred spaces, pipe shafts and in service tunnels not used for passage. Where piping and ducts run in areas that have hung ceilings, such piping and ducts must be installed in the hung ceilings. For Work on existing piping, any insulation on such existing piping is to be tested for asbestos and abated if found to be positive by a certified asbestos contractor. Such testing and abatement must occur prior to the performance of any Work on these pipes.

1.5 SUBMITTALS:

- A. **INTENT OF MECHANICAL CONTRACT DRAWINGS –** Mechanical Contract Drawings are, in part, diagrammatic and show the general arrangement of the equipment, ducts, and piping included in the Contract and the approximate size and location of the equipment.
- B. The Contractor must follow these Contract Drawings in laying out the Work and verify the spaces in which it will be installed. The Contractor must submit, as directed, Mechanical Shop Drawings, roughing drawings,



manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Submit sheet metal shop standards. Submit manufacturer's product data including gauges, materials, types of joints, scaling materials and installations for metal ductwork materials and products.
2. Submit scaled layout drawing (3/8"=1') of metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, slopes of horizontal runs, wall and floor penetrations and connections. Show modifications of indicated requirements made to conform to local shop practice and how those modifications ensure that free area, materials and rigidity are not reduced. Layouts should include all the room plans, mechanical equipment rooms and penthouses. Method of attachment of duct hangers to building construction all with the support details. Coordinate Shop Drawings with related trades prior to submission.
3. Indicate duct fittings, particulars such as gauges, sizes, welds and configuration prior to start of work for low-pressure systems.
4. Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data and shop drawings in maintenance manual.

1.6 ACCESS:

- A. All Work must be installed by the Contractor to readily provide access for inspection, operation, maintenance and repair. Minor deviations from the arrangement indicated on the Contract Drawings may be made to accomplish this, but they must not be made without prior written approval by the Commissioner.

1.7 CHANGES IN PIPING, DUCTS, AND EQUIPMENT:

- A. Wherever field conditions are such that for proper execution of the Work, reasonable changes in location of piping, ducts, and equipment are necessary and required, the Contractor must make such changes as directed and approved, without extra cost to the City.

1.8 CLEANING OF PIPING, DUCTS, AND EQUIPMENT:

- A. Piping, ducts, and equipment must be thoroughly cleaned by the Contractor of all dirt, cuttings, and other foreign substances. Should any pipe, duct, or other part of the several systems be obstructed by any foreign matter, the Contractor will be required to pay for disconnecting, cleaning, and reconnecting wherever necessary for the purpose of locating and removing obstructions. The Contractor must pay for repairs to other work damaged in the course of removing obstructions. For work on existing piping, ducts, and equipment, the Contractor must pay special attention during this task so as not to disturb the insulation on such piping, ducts, or equipment.

1.9 STANDARDIZATION OF SIMILAR EQUIPMENT:

- A. Unless otherwise particularly specified, all equipment of the same kind, type, or classification, used for identical purposes, must be the product of one (1) manufacturer.

1.10 SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR:

- A. Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor must be designed by an Engineer licensed in New York State retained by the Contractor. Supporting structures must be built by the Contractor of sufficient strength to safely withstand all stresses to which they may be



subjected, within permissible deflections, and must meet the following standards:

1. Structural Steel - ASTM Standard Specifications, AISC and New York City Construction Codes.
2. Concrete for supports for equipment must conform to the Specifications for concrete herein, but in no case must be less than the requirements of the New York City Construction Codes for average concrete.
3. Steel reinforcement for concrete must be of intermediate grade and must meet the requirements of the Standard Specifications for Billet Steel-Concrete Reinforcement Bars, ASTM.
4. Drawings and calculations must be submitted for review and acceptance in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1.11 ELIMINATION OF NOISE:

- A. All systems and/or equipment provided under the Contract must operate without objectionable noise or vibration.
- B. Should operation of any one or more of the several systems produce noise or vibration which is, in the opinion of the Commissioner, objectionable, the Contractor must, at its own expense, make changes in piping, equipment, etc., and do all work necessary to eliminate objectionable noise or vibration.
- C. Should noise or vibration that is found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from systems and/or equipment installed under the Contract, the Contractor must, at its own expense, install such insulators and make such changes in or additions to the installations as may be necessary to prevent transmission of this noise or vibration.

1.12 PRELIMINARY FIELD TEST:

- A. As soon as conditions permit, the Contractor must furnish all necessary labor and materials for, and must make preliminary field tests of the equipment to ascertain compliance with the requirements of the Contract. If the preliminary field tests disclose equipment that does not comply with the Contract, the Contractor must, prior to the acceptance test, make all changes, adjustments, and replacements as required.

1.13 INSTRUCTIONS ON OPERATION:

- A. At the time the equipment is placed in permanent operation by the City, the Contractor must make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The Contractor must instruct the City's operating personnel on the proper maintenance and operation of the equipment for the period of time called for in the Specifications.

1.14 CERTIFICATES:

- A. On completion of the Work, the Contractor must obtain certificates of inspection, approval, and acceptance, and be in compliance with all laws from all agencies and/or entities having jurisdiction over the Work and must deliver these certificates to the Commissioner in accordance with Section 01 77 00 CLOSEOUT PROCEDURES. The Work will not be deemed substantially complete until the certificates have been delivered.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 35 03



**Department of
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**SECTION 01 35 06
GENERAL ELECTRICAL REQUIREMENTS**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section sets forth the General Requirements applicable to electrical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Project Specifications and/or the Contract Drawings, whichever requirement is the most stringent, as determined by the Commissioner, must take precedence.
- B. This Section includes the following:
 - 1. Related Sections
 - 2. Definitions
 - 3. Procedure for Electrical Approval
 - 4. Submittals
 - 5. Electrical Installation Procedures
 - 6. Electrical Conduit System Including Boxes (Pull, Junction and Outlet)
 - 7. Electrical Wiring Devices
 - 8. Electrical Conductors and Terminations
 - 9. Circuit Protective Devices
 - 10. Distribution Centers
 - 11. Motors
 - 12. Motor Control Equipment

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 35 03 GENERAL MECHANICAL REQUIREMENTS
- D. Section 01 42 00 REFERENCES
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. **WIRING:** contains wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).
- B. **POWER WIRING:** wiring from a panel board or other specified source to a starter (if required), then to a disconnect (if required), then to the final point of usage such as a motor, unit, or device.



- C. CONTROL and/or INTERLOCK WIRING: wiring that signals the device to operate or shut down in response to a signal from a remote control device such as a temperature, smoke, pressure, float, etc. device (starters and disconnect switches are not included in this definition) regardless of the voltage required for the controlling device.
- D. RIGID STEEL CONDUIT: rigid steel heavy wall conduit that is hot-dip galvanized inside and outside. The conduit must meet the requirements of the latest edition, as amended, of the "Standard for Rigid Steel Conduit" of the Underwriters' Laboratories, Inc. Unless otherwise specified in the Specifications or indicated on the Contract Drawings, rigid steel conduit must be used for all exposed work, all underground conduits in contact with earth, and fire alarms systems, as required by the New York City Construction Codes.
- E. ELECTRICAL METALLIC TUBING (EMT): industry standard thin wall conduit of galvanized steel. All elbows, bends, couplings and similar fittings which are installed as a part of the conduit system must be compatible for use with electric metallic tubing. Couplings and terminating fittings must be of the pressure type as approved by the Commissioner. Set screw fittings will not be acceptable. EMT must meet the requirements of the latest edition, as amended, of the "Standard for Electrical Metallic Tubing" of the Underwriters Laboratories Inc. EMT may only be used where specifically indicated. In no case will EMT be permitted in spaces other than hung ceilings and dry wall partitions.
- F. FLEXIBLE METALLIC CONDUIT (FMC): a conduit made through the coiling of a self-interlocking ribbed strip of aluminum or steel, forming a hollow tube through which wires can be pulled. For final connections to motors and motorized equipment, not more than a 4' - 0" length of flexible conduit may be used. For watertight installations, this conduit must be of a watertight type, attached with watertight glands or fittings for final connections from outlet box to recessed lighting fixtures and in locations only where specifically permitted by the Specifications or Contract Drawings.

1.5 PROCEDURE FOR ELECTRICAL APPROVAL:

This Section sets forth General Electrical information, as well as required approvals for all electrical work required for the Project, including ancillary electrical work which may be included in the work of other trade subcontractors.

- A. ELECTRIC SERVICE: The electric service supply is subject to commercial and operating variation of the utility company. Proper provision must be made to have all apparatus operate normally under these conditions.
- B. ACCEPTANCE: Acceptance and approval of the Work will be contingent upon the inspection and test of the installation by the City regulatory agency.
- C. TESTS: The Contractor must notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the Work, tests must be made as required by the Commissioner of all electrical materials, electrical and associated mechanical equipment, and of appliances installed hereunder. The Contractor must furnish all labor and material for such tests. Should the tests show that any of the material, appliances or workmanship is not first class or not in compliance with the Contract, on written notice the Contractor must remove and promptly replace the materials to be in conformity with the Contract.
- D. CERTIFICATE OF THE BUREAU OF ELECTRICAL CONTROL, OF THE DEPARTMENT OF BUILDINGS (B.E.C.): Prior to requesting a substantial completion inspection, the Contractor must file a Certificate of Inspection issued by B.E.C. On completion of the Work, the Contractor must obtain certificates of inspection, approval, acceptance and compliance from all agencies and/or entities having jurisdiction over the work and must deliver these certificates to the Commissioner in accordance with Section 01 77 00 CLOSEOUT PROCEDURES.



E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT:

1. The Contractor furnishing any equipment must be responsible for the equipment until it has been inspected, tested and accepted, in accordance with the requirements of the Contract.
2. After delivery, before and after installation, the Contractor must protect all equipment against theft, injury or damage from all causes. The Contractor must carefully store all equipment received for work which is not immediately installed. If any equipment has been subject to possible injury by water, it must be thoroughly dried out and put through a special dielectric test as directed by the Commissioner, at the expense of the Contractor or replaced by the Contractor without additional cost to the City.

- F. UNIFORMITY OF EQUIPMENT:** Any two (2) or more pieces of equipment, apparatus or materials of the same kind, type, or classification, which are intended to be used for identical types of service, must be made by the same manufacturer.

1.6 SUBMITTALS:

A. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL:

1. The Contractor must submit to the Commissioner for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, complete dimensional drawings of all equipment, wiring diagrams, motor test data, details of control, installation layouts showing all details and locations and including all schedules, and descriptions and supplementary data to comprise complete working drawings and instructions for the performance of the Work. A description of the operation of the equipment and controls must be included. A letter, in triplicate, must accompany each submittal.
2. The Contractor must submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples must be properly tagged for identification and submitted for examination and test. After the samples are approved, one (1) sample will be returned to the Contractor and the other sample will be filed in the office of the Commissioner's representative for inspection use. After the Contract is completed, the second set of samples will be returned to the Contractor.

- B. TIMELINESS:** All material must be submitted in accordance with the Submittal Schedule in sufficient time for the progress of construction. Failure to promptly submit acceptable samples and dimensional drawings of equipment will not be accepted as grounds for an extension of time. The Commissioner may decline to consider submittals unless all related items are submitted at the same time.

- C. CONTRACTOR'S STATEMENT WITH SUBMITTALS:** Contractor must submit a statement in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.

- D. BULLETINS AND INSTRUCTIONS:** The Contractor must furnish and deliver to the Commissioner in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS and Section 01 77 00 CLOSEOUT PROCEDURES, after acceptance of the work, four (4) complete sets of instructions, technical bulletins and any other printed matter (diagrams, prints, or drawings) required to provide complete information for the proper operation, maintenance and repair of the equipment and the ordering of spare parts.



PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 ELECTRICAL INSTALLATION PROCEDURES:

This Sub-Section sets forth the General Installation Procedure that must apply to all electrical work and electrical equipment appearing in the Contract.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

- A. **INTENT OF CONTRACT DOCUMENTS:** The Drawings and Specifications are to be interpreted as a means of conveying the scope and intent of the work without giving every minor electrical detail. It is intended, nevertheless, that the Contractor must provide whatever labor and materials are found necessary, within the scope of the Contract, for the successful operation of the installation. Specific details of individual installations are to be finally decided upon when the Contractor submits Working or Shop Drawings for approval to DDC. Whenever there are two (2) or more methods to complete Project work within the Contract scope, the Commissioner reserves the right to choose that method which, in the Commissioner's opinion, will afford the most satisfactory performance, lasting qualities, and access for repairs, even if this selection is the costliest.
- B. **SCHEMATIC PLANS – APPROXIMATE LOCATIONS:** Conduits and wiring are shown on the plans for diagrammatic purposes only. Therefore, conduit layouts may not necessarily give the actual physical route of the conduits. The Contractor who installs a conduit system will also be required, as part of the work, to furnish and install all hangers and pull-boxes, including any special pull-boxes found necessary to overcome interferences, and to facilitate the pulling of electrical cables. Similarly, the locations of equipment, appliances, outlets and other items shown on Contract Drawings are only approximate and are to be definitively established when equipment Shop Drawings are submitted and approved by DDC during construction.
- C. **SLEEVES:** required for conduits passing through walls or floors; must be furnished and set by the Contractor installing the conduits. Sleeves in waterproofed floors must be provided with flashing extending twelve (12) inches in all directions from sleeve and secured to waterproofing. Flashing must be turned down into space between pipe and sleeve and caulked watertight. Flashing must be twenty (20) ounces cold rolled copper. Sleeves must be supplied with welded flanges similar to those supplied by the subcontractor for Plumbing Work and must extend one (1) inch above finished floor.
- D. **COORDINATION:** The Contractor must keep in close touch with the construction progress and promptly obtain the necessary information for the accurate placement of its work well before Project construction operations obstruct its work. The Contractor is to consult all other Contract Drawings, as well as approved equipment Shop Drawings on file in the Resident Engineer's Field Office. This will aid in avoiding interferences, omissions, and errors in the electrical installation.
- E. **RESTORATION:** If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface must be repaired or replaced by the Contractor. The Contractor must be held responsible for corrective restoration due to its cutting or drilling, and for any damage to the Project or its contents caused by the Contractor or the Contractor's workers. If any piercing of waterproofing occurs because of the installation of the work, the Contractor must restore the waterproofing, at its own expense, to the satisfaction of the Commissioner.
- F. **ELECTRICAL WORK AT SITE:** The Contractor furnishing equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, must furnish this unit, ready for connection and operation, complete with internal wiring, connections, terminal boxes with



copper connectors and/or lugs and ample electrical leads. The cost of any wiring, re-wiring, or other work required to be done on this unit in the field, must be borne by the Contractor, without additional cost to the City.

- G. **COOPERATION AMONG SUBCONTRACTORS:** Whenever an electrically operated unit or system involves the combined work of several subcontractors for its installation and successful operation, the Contractor must require each subcontractor to exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2

3.2 ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET):

This Sub-Section sets forth the requirements applying to the installation of electrical conduits, boxes or fittings. Rigid steel conduit must be used throughout, unless otherwise directed by the Commissioner. Where the word 'conduit' is used without a modifier such as, rigid steel, EMT, etc., must be interpreted to mean rigid steel, heavy wall, threaded conduit.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

A. **INSTALLATIONS AND APPLICATIONS:**

1. Unless otherwise specified or indicated on the Contract Drawings, conduit runs must be installed concealed in finished spaces.
2. **CONDUIT SIZES:** The sizes of conduits must be as indicated on the Contract Drawings. Wherever conduit sizes are not indicated, the conduit must meet the requirements of the New York City Electrical Code to accommodate the conductors to be installed therein.
3. Conduits must be reamed smooth after cutting. No running threads will be permitted. Universal type couplings must be used where required. Conduit joints must be screwed up to butt. Empty conduits after installation must have all open ends temporarily plugged to prevent the entrance of water or other foreign matter.
4. Conduits installed in concrete or masonry must be securely held in place during pouring and construction operations. A group of conduits terminating together must be held in place by a template.
5. **UNDERGROUND STEEL CONDUITS:** Unless otherwise specified, all underground steel conduits in contact with earth must be encased by the Contractor who installs them, in a covering of not less than two (2) inches of an approved concrete mixture. Concrete mix must be one (1) part cement to four and one-half (4 ½) parts of fine and coarse aggregate.
6. **EXCAVATION RESTORATION PERMITS:** When installing underground conduits, duct banks or manholes, the Contractor must perform the work of cutting pavement, excavation shoring, keeping trenches or holes pumped dry, backfilling, restoration of surfaces to original condition and removal of excess earth and rubbish from premises. During the work, the Contractor must provide adequate crossovers, protective barriers, lamps, flags, etc., to safeguard traffic and the public. When the work is in a public highway or street, the Contractor must secure and pay for all necessary permits, inspection fees, and the cost of repaving.
7. **EXPOSED CONDUIT SUPPORTS:** Exposed conduits must be supported by Galvanized hangers with necessary inserts, beam clamps of approved design, or attached to walls or ceilings by expansion bolts. Exposed conduits must be supported or fastened at intervals not more than five (5) feet.



8. Exposed conduits must be installed parallel or at right angles to ceilings, walls and partitions. Where direction changes of exposed conduit cannot be made with neat bends, as may be required around beams or columns, conduit-type fittings must be used.
9. Conduit must be installed with an expansion joint approved by the Commissioner in the following conditions:
 - a. Wherever the conduit crosses a building expansion joint, the Contractor will be held responsible for determining where the building expansion joints are located.
 - b. Every 200 feet, when in straight runs of 200 feet or longer.
10. Conduits may only enter and leave a floating slab in a vertical direction, and only in an approved manner. Horizontal entries into floating slabs are not permitted.
11. Conduits installed in pipe shafts must be properly supported to carry the total weight of the raceway system complete with cable. In addition, at least one (1) horizontal brace per 10 ft. section must be provided to assure stability of the raceway system.
12. BUSHINGS AND LOCKNUTS: Approved bushings and locknuts must be used wherever conduits enter outlet boxes, switch boxes, pull boxes, panel board cabinets, etc.
13. CONDUIT BENDS: must be made without kinking conduit or appreciably reducing the internal diameter. All bends in conduits of two (2) inch in diameter or larger must be made with a hydraulic or power pipe bender. The radius of the inner edge of any bend must not be less than six (6) times the internal diameter of the conduit where rubber covered conductors are to be installed, and not less than ten (10) times the internal diameter of the conduit where lead covered conductors are to be used. Long gradual sweeps will be required, rather than sharp bends, when changes of direction are necessary.
14. EMPTY CONDUITS
 - a. TESTS: All conduits and ducts required to be installed and left empty must be tested for clear bore and correct installation by the Contractor using a ball mandrel and a brush and snake before the installation will be accepted. The ball must be turned to approximately 85% of the internal diameter of the raceway to be tested. Two (2) short wire brushes must be included in the mandrel assembly. Snaking of conduits, ducts, etc., must be performed by the Contractor in the presence of the Resident Engineer. Any conduits or ducts which reject the mandrel must be cleared at once with the Contractor bearing all costs, such as chopping concrete, to replace the defective conduit and restore the surface to its original condition.
 - b. TAGS: Numbers or letters must be assigned to the various conduit runs, and as they test clear they must be identified by a fiber tag not less than 1-¼ inch width, attached by means of a nylon cord. All conduit terminations in panel, splice or pull boxes, as well as those out of the floor or ceiling, must be tagged.
 - c. TEST RECORDS: As the conduit runs clear, a record must be kept under the heading of "Empty Conduit Tested, Left Clear, Tagged and Capped" showing conduit designation, diameter, location, date tested and by whom. When complete, this record must be signed by the Resident Engineer and submitted in triplicate for approval. This record must be entered on the Contract Record Drawings under Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 - d. CAPPING: After test, all empty conduit and duct openings, must be capped or plugged by the Contractor as directed.
 - e. DRAG LINES: A drag line must be left in all empty conduit.



B. BOXES:

1. The Contractor must furnish and erect all pull boxes indicated on the plans or where required. Sides, top and bottom of pull boxes must be Galvanized coated and must be built of No. 12 USSG steel reinforced at corners by substantial angle irons and riveted or welded to plates. Bottom or side of pull boxes must be removable and held in place by corrosion resistant machine screws. Pull boxes in damp locations must have threaded hubs and gaskets and be NEMA 4X. All pull boxes must be suspended from ceiling or walls in the most substantial manner.
2. In centering outlets, the Contractor is cautioned to allow for overhead pipes, ducts and other obstructions, and for variations in arrangement and thickness of fireproofing, soundproofing and plastering. Precaution should be exercised regarding the location of window and door trims, paneling, etc. Mistakes resulting from failure to exercise precaution must be corrected by the Contractor at no additional cost to the City. Outlets in hung ceilings must be supported from the black iron or structure.
3. The exact location of all outlets in finished rooms must be as directed by the Commissioner. When the interior finish has been applied, the Contractor must make any necessary adjustment of its work to properly center the outlets. All outlet boxes for local switches near doors must be located at the strike side of doors as finally hung, whether so indicated on the drawings or not.
4. Exposed wall outlet boxes must be securely anchored, erected neatly and tight against the walls.
5. All wall outlets of each type must be set accurately at the same level on each floor, except where otherwise specified or directed by the Commissioner. Where special conditions occur, outlets must be located as directed.
6. MOUNTING HEIGHTS: The following heights are standard heights and are subject to correction due to coordination with Contract Drawings. All such changes must be approved by the Resident Engineer. Heights given are from finished floor to center line of outlet or device on wall or partition, unless otherwise indicated.

a. General Convenience Outlets (mount vertical)	1'-6"
b. Clock Outlets	8'-6" or 1'-6" below ceiling
c. Wall Lighting Switches	4'-0"
d. Motor Controllers	5'-0"
e. Motor Push-button	4'-2"
f. Telephone Outlets	As Directed by the Commissioner
g. Fire Alarm Bells	8'-6" or 1'-6" below ceiling
h. Fire Alarm Stations	4'-0"
i. Intercom Outlet	1'-6"
j. Cooking and Refrigerator Unit	As Directed
7. Outlet boxes must be of a design and construction approved by the Commissioner. The type of box, including its form and dimensions, must be appropriate for: its specific location; the kind of fixture to be used; and, the conduits (both quantity and type) that will connect to it. All ferrous outlet boxes must meet the requirements for zinc coating as specified under Electrical Conduit Systems.
8. Knockouts will only be opened to insert conduit. Any outlet boxes with more openings than are necessary for conduit insertion must be sealed by the Contractor without additional charge.
9. All outlet boxes and junction boxes for exposed work must be galvanized cast iron or cast aluminum with threaded openings. Outlet boxes for exposed inside work in damp locations must be galvanized cast iron or cast aluminum with threaded hubs and neoprene gaskets.
10. Junction boxes must not be less than 4 11/16" square and must be equipped with zinc coated plates. Where plates are exposed they must be finished to match the room decor.



11. **FIXTURE SUPPORTS:** Outlet boxes supporting lighting fixtures must be equipped with fixture studs held by approved galvanized stove bolts or integral with the box. Cast iron or malleable boxes must have four (4) tapped holes for mounting required cover or fixtures.
12. Outlet boxes exposed to the weather or indicated W.P. must be cast iron or cast aluminum with the covers made watertight with neoprene gaskets. The boxes must have external lugs for mounting. Drilling of the body of the fitting for mounting will not be permitted. The cover screws must be appropriate in size, non-corrodible and not less than four (4) in number for each box opening.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 ELECTRICAL WIRING DEVICES:

- A. **WALL SWITCHES:** must be of the best specification grade, quiet type, and must have a rating of 20 Amperes at 277 volts, as manufactured by Bryant, Hubbell or approved equal. The mechanism must be equipped with arc snuffers. They must be of the tumbler type, single pole. Switches of the 3-way type must have a similar rating.
- B. **RECEPTACLES:**
 1. **CONVENIENCE OUTLETS:** must be of the best specification grade, duplex, two-pole, 3-wire, 20 Amperes at 125 volts. It must have a grounding pole that must be grounded to the conduit system. Receptacles must be capable of both back and side wiring and must have only one (1) grounding screw. Receptacles must be Hubbell Catalog #5262 or approved equal.
 2. **HEAVY DUTY RECEPTACLE OUTLETS:** must have the Ampere rating and the number of poles specified on the Contract Drawings and must be Hubbell, Russell-Stoll, Bryant, AH & H or approved equal. Each outlet must have a grounding pole, which must be grounded to the conduit system.
 3. **FLOOR RECEPTACLES:** must be Russell & Stoll #3040 or approved equal, to fit into floor box previously specified.
 4. **NAMEPLATES:** are required for all receptacles other than 120V.
- C. **CLOCK HANGERS:** Clock outlets for surface type clocks must be equipped with a supporting hook and recessed faceplate to conceal the electrical cord.
- D. **WATERTIGHT DEVICES:** For installations exposed to weather or in damp locations, the devices must be in a gasketed, cast iron enclosure.
- E. **PLATES:**
 1. Every convenience outlet and switch outlet must be covered by means of a stainless steel No. 302 - 0.4" antimagnetic plate with an approved finish, unless provided otherwise in the detailed Specifications.
 2. Where two (2) or three (3) switches are grouped together, a single faceplate must be used. Where more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4

3.4 ELECTRICAL CONDUCTORS AND TERMINATIONS:

- A. **CONDUCTORS FOR LIGHT AND POWER:** All wire and cable must be of annealed copper of 98% conductivity. Aluminum wire or cable will not be permitted. The insulation must be flame retardant, moisture and heat resistant, thermoplastic, type THW or THWN rated for 600 volts at 75 degrees Celsius (C.) for both wet and dry locations. Wires No. 8 or larger must be stranded. Wires and cables must also



be subject to the requirements of the NYCEC. Cables for incoming service, or wire in conduits contiguous with the earth, in concrete, or other damp or wet locations, must be synthetic rubber insulated with neoprene jacket, heat and moisture resistant and must be equal to UL Type USE and rated for 600 volts at 75 degrees C. for both wet and dry locations.

- B. **FIXTURE WIRE:** Lighting fixtures must be wired with No. 14 gauge wire designated as AWM and rated at 105 degrees C.
- C. **OTHER TYPES:** Cables and wires for interior communication systems are described in applicable detailed Specifications.
- D. **MINIMUM SIZE:** Conductors smaller than No. 12 AWG must not be used for light or power.
- E. **COLOR CODE:** Wires must have a phase color code, and multiple conductor cables must be color coded.
- F. **CABLE DATA:** The Contractor must submit for approval the following information for each size and type of cable to be furnished:
 - 1. **Manufacture of Cable - Location of Plant.**
 - 2. **Minimum insulation resistance at standard test temperature.**
 - 3. **Days required for delivery to site of work after order to proceed with manufacture.**
- G. **ORIGINAL REELS:** Cable and wire must be delivered to the site of the work on original sealed factory reels.
- H. **WIRE INSTALLATION:**
 - 1. **INSTALL WIRES AFTER PLASTERING:** Feeder and branch circuits wiring must not be installed into conduit before the rough plastering work is completed. No conductors must be pulled into floor conduits before floor is poured.
 - 2. **CONDUIT SECURED IN PLACE:** No conductor must be pulled into any conduit run before all joints are made up tightly and the entire run rigidly secured in place.
 - 3. **WIRE ENDS:** All wires must be left with sufficiently long ends for proper connection and stowing.
 - 4. **PULLING COMPOUNDS:** to ease the pulling-in of wires into the conduit, only approved compounds as recommended by cable manufacturers must be used.
 - 5. **PRESSURE CONNECTORS:** pressure connectors for wires must be of the cast copper or forged copper pressure plate type. Connectors must be O.Z., Burndy, National Electric Products or approved equal.
 - 6. **Splices and feeder taps in the gutters of panel boxes must be made by means of pressure plate-type connectors encased in composition covers as manufactured by O.Z., Burndy, National Electric Products or approved equal.**
 - 7. **Splices in branch wiring for sound systems and fire systems, must be first made mechanically secure, then soldered and taped.**
 - 8. **In lieu of soldered splices (except for sound and fire systems, which must have soldered splices) the following alternates are acceptable for operating temperatures up to 105 degrees C., for fluorescent fixtures and for the splicing of branch circuit wiring up to No. 8 AWG wire:**
 - a. **Mechanical splices made with mechanical connectors as manufactured by the Minnesota Manufacturing Company "Scotchlock" or approved equal. Mechanical connectors requiring a special tool (pressure connectors, insulators and locking rings) by Buchanan or approved equal. The tool used for connector application must be as approved by the connector manufacturer.**



- b. For branch circuit wire and cable No. 6 AWG and larger, the seamless tubular connector will only be accepted. Application of this connector must be with a tool recommended by the connector manufacturer.
- 9. TAGS: All feeders and risers must be tagged at both ends, and in all pull and junction boxes and gutter spaces through which they pass. Such tags must be of fiber and have the feeder designation and size stamped thereon.
- 10. BRANCH CIRCUIT WIRING:
 - a. The Contractor installing branch circuit wiring must test the work for correct connections and leave all loop splices in the fixture outlet boxes properly spliced and taped. The Contractor must provide wire ends long enough for convenient connection to device.
 - b. NEUTRALS: No common neutrals must be used except for lighting branch circuits. Each neutral wire must be terminated separately on a neutral busbar in the panelboard. No common neutrals will be permitted for convenience receptacle branch circuits.
- I. TERMINATIONS
 - 1. LUGS: All lugs for all devices and all cable terminations must be copper. AL/CU rated lugs will not be permitted. The only exception to this requirement is when the particular device is not manufactured with copper lugs by any manufacturer. Lugs for No. 6 AWG cable and larger must be cast copper or forged copper pressure plate type. Lugs for 1/0 and larger must be fastened with two (2) bolts.
 - 2. All lugs must be of the proper size to accept the cable connected to them. Any subcontractor furnishing a device containing lugs is to coordinate with the Contractor to ensure that the device terminations are adequate for the wire or cable (whose size may be larger than expected due to voltage drop considerations) connected to the device.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.5

3.5 CIRCUIT PROTECTIVE DEVICES:

This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panel boards and Service Entrance.

- A. CIRCUIT BREAKERS:
 - 1. CIRCUIT BREAKERS: must be operable in any position and must be of the quick-make, quick-break type on manual operation. The handle must be trip free, preventing contacts from being held in closed position against abnormal overloads or short circuits. Positive visual indication of automatic tripped position of breaker must be provided, in addition to the "On" and "Off" indication. All circuit breakers must be of the bolted type.
 - 2. TRIP RATING: Circuit breakers must be provided with the required number of trip elements, calibrated at 40 degrees C., ambient temperature, in accordance with wire sizes or motor currents as shown on Contract Drawings or indicated in the Specifications.
 - 3. POLE BARRIER: Multipole pole breakers must be designed to break all poles simultaneously. They must be provided with barriers between poles and arc suppressing devices.
 - 4. ELEMENTS: Multipole circuit breakers must have frames of not less than a 100 Ampere rating. Multipole circuit breakers for 480 volts AC operation must have an NEMA interrupting rating of 18,000 Amperes, unless a higher rating is specified in the Specifications or indicated on the Contract Drawings.
 - 5. For circuit breakers with frame size up to and including 225 Amperes, the breakers may be



provided with non-interchangeable trip elements. For frame ratings above 225 Amperes, the breakers must be provided with interchangeable trip elements, which can be replaced readily.

6. Single pole circuit breakers for branch circuits must have a frame size of no less than 100 Amperes, and must be rated at 125 volt A.C. with a NEMA interrupting rating of 10,000 Amperes, unless a higher rating is specified in the Specifications or indicated on the Contract Drawings.
7. INVERSE TIME ACTION: The circuit breakers must be dual element type, one (1) element with time limit characteristics, so that tripping will be prevented on momentary overloads, but will occur before dangerous values are reached and the other with instantaneous trip action. Inverse time delay action must be effective between a minimum tripping point of 125% of rating of breaker and an instantaneous tripping point between 600% and 700% of rated current.
8. CONSTANCY OF CALIBRATION: The tripping elements must insure constant calibration and be capable of withstanding excessive short circuit conditions without injury.
9. CONTACTS: must be non-welding under operating conditions and of the silver to silver type.
10. TEMPERATURE RISE: Current carrying parts, except thermal elements, must not rise in temperature in excess of 30 degrees C. while carrying current at the part's rated current and frequency.
11. NUMBERING: Each circuit breaker must be distinctly numbered when installed in a group with other breakers. The calibration of trip element must be indicated on each breaker.

B. SAFETY SWITCHES:

NEMA TYPE HD: When safety switches are permitted to be used for service entrance, motor disconnecting means or to control other types of electrical equipment, they must be of the type HD of a rating not less than 30 Amperes. Enclosures must be provided with means for locking. For ratings above 60 Amperes terminals must have double studs.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.6

3.6 DISTRIBUTION CENTERS:

This Section sets forth the construction and installation procedure for Switchboards, Panel boards and Cabinets.

- A. PANEL BOARDS, GENERAL TYPE: The panel boards must be of the automatic circuit breaker type with individual breakers for each circuit, removable without disturbing the other units. Circuit breakers must be in accordance with the requirements outlined under Section 3.5, "Circuit Protective Devices."
- B. NUMBER AND RATING OF CIRCUIT BREAKERS: The Contract Drawings show a layout of each panel, giving the number, frame, size and trip setting of circuit breakers and number of branch circuits and spare breakers. Each branch circuit must be distinctly numbered.
- C. BUS BAR CONSTRUCTION AND SUPPORT: Panel Boards must be of the dead front type and must have bus bars and branch circuits designed to suit the system and voltage. Current carrying parts, exclusive of circuit breakers, must be copper and based on a maximum density of 1,000 Amperes per square inch. Bus bars for the main switchboard must be designed for the frame rating of the Service Breaker. Bus bars must run up the center of the panel, unless otherwise indicated, and must have connected thereto the various branch circuits. Unless otherwise specified, bus bars for each panel board must be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers must be used. A neutral bus of at least the same capacity as a live bus bar must be provided for the connection of all neutral conductors. Each terminal must be identified. All current carrying parts, exclusive of circuit breakers, must be of copper with a minimum number of joints. The bus bar structure must be a self-supporting unit, firmly fastened to a ½



- inch plastic board, extending the full length and width of assembly which must serve to insulate the bus structure from the back of panel box. Other methods affording equally effective bus structure support and insulation will be given consideration. An insulating barrier must separate neutral bus from other parts of panel.
- D. **CIRCUIT BREAKER ASSEMBLY:** The entire circuit breaker and bus bar assembly must be mounted on an adjustable metal base or pan and secured to the back of the panel box. The panel must have edges flanged for rigidity.
- E. **PANEL MOUNTING:** The panel must be centered in the panel box, line up with the door openings, be set level and plumb, and no live parts may be exposed with the door open.
- F. **PANEL CABINET:**
1. **PANEL CABINET INSTALLATION:** When installed, surface mounted in panel closets must be mounted on Kindorf channel.
 2. Where cabinets cannot be set entirely flush due to masonry walls or partitions or where cabinet is extra deep, the protruding sides of cabinet must be trimmed with a metal or hardwood return molding of approved design and fastened to cabinet so as to conceal the intersection between the wall and cabinet.
- G. **NAMEPLATES:** Where required, nameplates must be made of engraved Lamicoide sheet, or approved equal. Letters and numbers must be engraved white on a black background (except for Firehouse projects which must have white letters on a red background). The Contractor must submit an engraved sample for approval as to design and style of lettering before proceeding with the manufacture of the nameplate. Nameplates must be of suitable size and must also be provided at the top of the switchboard or section thereof and on the trim at the top of all lighting and power panels. Similar nameplates must also be provided for each distribution circuit breaker giving the breaker number, the number of the feeder, and the name of the equipment fed.
- H. **SHOP DRAWINGS:** showing all details of boxes, panels, etc., must be submitted for approval.
- I. **DIRECTORIES:** A directory must be fastened with brass screws and consist of a noncorrosive metal frame with dimensions not less than five (5) inches x eight (8) inches and a transparent window of Plasticite, Plexiglass, Lucite, Polycarbonate or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory must be typewritten and show the number and name of each circuit, and lighting or equipment supplied. The size of riser feeder must be as indicated on the directory. The dimensions of the directory must be submitted for approval for each size of panel.
- J. **CONSTRUCTION**
1. **FINISH:** Panel boxes, doors and trim for installation in dry locations, must be zinc coated after fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panel boards must be enclosed and gasketed NEMA 3R type. Panel boards located outdoors or exposed to the weather must be NEMA 3X type.
 2. **PAINTING:** Panel boxes, doors and trim must receive a coat of approved priming paint and a second coat of approved paint in the field after installation. Paint must be applied to the inside and outside of boxes and on both sides of trim. Panel trims and doors must receive a third or finishing coat on the outside after installation. Approval as to texture and color must be obtained before the final coat is applied.



REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.7

3.7 MOTORS:

This Section sets forth the general design, construction and performance requirements, which must apply to all motors furnished in the Contract.

- A. **MOTOR DESIGN:** All motors must be designed to comply with the New York State Energy Conservation Construction Code and the New York City Energy Conservation Code. In the event of any conflict or inconsistency between such codes, the New York City Energy Conservation Code must prevail. Motors must have standard NEMA frames and must have nameplate ratings adequate to meet the specified conditions of operation. Motor performance under variable conditions of voltage and frequency must be within the limits set in NEMA standards, unless modified in the Specifications. Motors must be expressly designed for the hazard duty load, voltage and frequency as specified in the Contract. All motor windings must be copper. All motors intended to operate on a 208 volt system must be designed and rated for 200 volts.
- B. **STANDARDS OF COMPARISON:** In the absence of specific motor specifications, in general, the best standard products of the leading motor manufacturers must be considered as a standard for comparison. The requirements of the NEMA standards for motors and generators must be deemed to contain the minimum requirements of performance and design.
- C. **OBJECTIONABLE NOISES:** Objectionable noises will not be tolerated and exceptionally quiet motors may be required for certain specified locations. Noise control tests as per the New York City Construction Codes may be performed as directed by the Commissioner. Such motors must bear a nameplate lettered "Quiet Motor." Springs and slip rings must be of approved non-ferrous material.
- D. **BEARINGS:**
 - 1. Bearings, unless specified otherwise, must be of the ball or roller type. Motors one (1) horsepower and larger that are equipped with ball roller bearings must also have lubrication of the pressure-relief greasing type. The Contractor furnishing four (4) or more such motors must also furnish, as part of the Contract, a pressure grease gun of rugged design, of approximately ten (10) ounce capacity, complete with necessary adapters. The Contractor must also provide ten (10) pounds of approved gun grease.
 - 2. For any particular unit where sleeve bearings are deemed desirable, permission for their use may be granted by the Commissioner. Motors one (1) horsepower and larger that are equipped with sleeve type bearings must, in addition to having protected fittings easily accessed for oiling, be provided with visible means for determining normal oil level. Lubrication must be positive, automatic and continuous.
- E. **MOTOR TERMINALS AND BOXES:** Each motor must be furnished with flexible leads of sufficient length to extend for a distance of not less than three (3) inches beyond the face of the conduit terminal box. This box must be furnished of ample size to make and house motor connections. These requirements must be met irrespective of any other standards or practices. Size of cable terminals and conduit terminal box holes must be subject to approval. For motors five (5) horsepower or larger, each terminal must come with two (2) cast or forged copper pressure type connectors with bolts, nuts and washers. For motors of smaller ratings, connectors of other acceptable types may be furnished. For installations exposed to the weather or moist locations, terminal boxes must be of cast iron with threaded hubs and gasketed covers. Cover screws must be of non-corrosive material.
- F. **MOTOR TEMPERATURE RISES:** The motor nameplate temperature rises for the various types of motor enclosures must be as listed below:

1. Open Frame	40 degrees C.
2. Totally enclosed and enclosed fan cooled	55 degrees C.
3. Explosion proof and submersible	55 degrees C.



4. Partially enclosed and drip proof 40 degrees C.

The temperature of the various parts of a motor must meet the requirements of NEMA standards for the size and type of the motors. Tests for heating must be made by loading the motor to its rated horsepower and keeping it so loaded for the rated time interval or until the temperature becomes constant.

- G. SPECIAL CODE INSTALLATIONS: Electrical installations covered by special publications of NBFU and by special City rulings and regulations must comply in design and safety features with such applicable codes, regulations and rulings, and must be furnished and installed complete with all accessories and safety devices as therein specified.
- H. MOTORS ON LIGHTING PANELS: The largest A.C. motor permitted on branch circuits of lighting panels must not exceed 1/4 horsepower.
- I. MOTORS RATED: 1/2 horsepower and larger must be polyphase.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8

3.8 MOTOR CONTROL EQUIPMENT:

This Section sets forth the requirements for motor controllers and associated devices. Such requirements are applicable to all motor control equipment furnished or installed.

- A. MANUFACTURER: All control equipment furnished under the Contract must be the product of a single manufacturer. Exceptions to this rule may be granted in the case of controllers for fractional horsepower motors driving special equipment, the various units of which have been engineered to obtain specific performance.
- B. CONTROL ITEMS REQUIRED: The Contractor furnishing motors must also furnish therewith complete disconnecting, starting and control equipment as required by the detailed Specifications, the various code authorities and for the successful operation of the driven equipment. These items include circuit breakers, magnetic starters with overload protection and low voltage release or protection, push button stations, pilot lights and alarms, float, pressure, temperature and limit switches, load transfer switches, devices for manual operation and speed controllers, etc. The Contractor must furnish as many of these items as required for the successful operation of the driven unit.
1. Where a motor is to be located out of sight of the controller, the Contractor must furnish an approved disconnecting means to be mounted near motor.
- C. TYPES OF STARTERS:
1. SQUIRREL CAGE: A.C. motors of the squirrel cage type, rated from one (1) to thirty (30) horsepower, must have magnetic across the line starters; motors rated above thirty (30) horsepower must be furnished with reduced voltage (autotransformer type) starter or part winding start with time delay to reduce inrush current. Size of starters must be based on 200V operation.
2. SLIP RING: A.C. motors of the slip-ring type must be furnished with primary across the line starters interlocked with secondary starting and regulating equipment. The interlocking feature must prevent starting of the motor when the secondary controller is off the initial starting point.
3. MAGNETIC: For fractional horsepower motors, magnetic type starters are not required unless the particular method of controlling the driven equipment makes them necessary. Where individual single phase fractional horsepower motors or the sum of fractional horsepower motors controlled by an automatic device are 1/2 horsepower or more, magnetic starters and circuit breakers must be used. Single phase A.C. motors smaller than 1/2 horsepower or three-phase A.C. motors smaller than one (1) horsepower where manual control is specified may be furnished with starters of toggle switch or push button type with inbuilt thermal protection. No additional disconnecting means is required to be furnished with this type of starter. This type of starter may also be used in series



with automatic control devices such as thermostats, float and pressure switches, provided the individual motor or the sum of fractional horsepower motors is less than ½ horsepower. Means for manual operation must be provided.

- D. **DISCONNECTING BREAKER:** All motor starters, unless otherwise specified, must be provided with a disconnecting means in the form of a circuit breaker of the type specified under Article 3.5 CIRCUIT PROTECTIVE DEVICES. This disconnecting means must be contained in the same housing with the starter and must be operable from outside. Means must be provided for locking the handle of the circuit breaker in the "OFF" position if it is desired to take the equipment out of service and prevent unauthorized starting.
- E. **CONTROL CABINET – DRY LOCATIONS:** All starters must be furnished with general purpose, NEMA Type 1, sheet metal enclosures with hinged covers and baked enamel finish.
- F. **CONTROL CABINET – WATERTIGHT:** In wet locations, cast iron watertight enclosures with threaded hubs, galvanized and gasketed hinged covers must be provided.
- G. **PANELS:** Motor control devices and appliances must be mounted on approved insulating slabs with all wiring and connections made on the back of the slabs.
- H. **WIRING AND TERMINALS:** Wiring connections for currents of one hundred (100) Amperes or less may be made with copper wire or cable with special flameproof insulating coverings. Such wires must be installed in a neat workmanlike manner, flat against the slab, and held in place by clips. Connections must be made with pressure connectors for No. 8 AWG and larger wires, and with grommets for small stranded wires. Except for incoming and outgoing main leads, all connections must terminate on approved connector blocks, which may be installed on the face of the slab. For small, across the line starters, the above requirements may be modified if satisfactory connections are provided.
- I. **COPPER BUS:** For currents exceeding one hundred (100) Amperes, copper bus must be used in place of wires. The bus must be constructed of copper rods, tubing or flat strap, bent and shaped properly and securely attached to the slab in a neat and workmanlike manner. The cross section of copper must provide sufficient areas to keep current density at not more than one thousand (1,000) Amperes per square inch.
- J. **COOPERATION:** The Contractor's subcontractor(s) who furnish electrically operated equipment must give to the Contractor and the Contractor's electrical subcontractor full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

END OF SECTION 01 35 06



**Department of
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Division 01 – DDC STANDARD GENERAL CONDITIONS
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**SECTION 01 35 26
SAFETY REQUIREMENTS PROCEDURES**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. The Contractor shall comply with the requirements of “*The City of New York Department of Design and Construction Safety Requirements*”. This document is included in the Information for Bidders.

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Safety and Health Requirements, including:
 - 1. Definitions
 - 2. Required Safety Meeting
 - 3. Compliance with Regulations
 - 4. Submittals
 - 5. Personnel Protective Equipment
 - 6. Hazardous and / or Contaminated Materials
 - 7. Emergency Suspension of Work
 - 8. Protection of Personnel
 - 9. Environmental Protection

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 REQUIRED SAFETY MEETINGS:

- A. Prior to commencing construction, the Resident Engineer will schedule and hold a preconstruction kick-off meeting either at DDC’s main office or at the Project site with representatives of the Contractor, including the principal on-site project representative, one or more safety representatives, the Commissioner’s designated representatives and other concerned parties for the purpose of reviewing the Contract safety requirements. Additionally, implementing Work safety provisions must be discussed.
- B. The Contractor is responsible for conducting weekly documented jobsite safety meetings, given to all jobsite personnel including all subcontractors on the Project, with the purpose of discussing safety topics and job-specific requirements at the DDC worksite.



1.5 COMPLIANCE WITH REGULATIONS:

- A. The Work, including contact with or handling of hazardous materials, disturbance or dismantling of structures containing hazardous materials, and disposal of hazardous materials, shall comply with the applicable requirement for 29 CFR Parts 1910 and 1926, and 40 CFR, Parts 61, 261, 761 and 763.
- B. Work involving disturbance or dismantling of asbestos or asbestos-containing materials, demolition of structures containing asbestos and removal of asbestos, shall comply with 40 CFR Part 61, Subparts A and M, and 40 CFR Part 763, as applicable.
- C. Additionally, Work shall comply with all applicable federal, state, and local safety and health regulations.
- D. In case of a conflict between applicable regulations, the more stringent requirements shall apply.
- E. All workers working on the DDC Project site are required by NYC Local Law 41 to complete the OSHA 10-hour training course.

1.6 SUBMITTALS:

- A. The Contractor shall submit to the Resident Engineer, copies of the Safety Program, Site Safety Plan and other required documentation in accordance with the “*New York City Department of Design and Construction Safety Requirements*”.
- B. Permits: If hazardous materials are disposed of off-site, the Contractor must submit to the Resident Engineer copies of shipping manifests, permits from applicable federal, state, or local authorities and disposal facilities, and certificates that the material has been disposed of in accordance with regulations.
- C. Accident Reporting: Submit a copy of each accident report to the Resident Engineer in accordance with the “*New York City Department of Design and Construction Safety Requirements*”.
- D. All asbestos and lead project regulatory notifications are to be submitted to DDC’s Office of Environmental and HazMat Services (OEHS) through the Resident Engineer.
- E. Request for Subcontractor Approval: Any subcontractor performing environmental work must submit required documentation for approval to perform such work as required by DDC’s OEHS.

PART II – PRODUCTS

2.1 PERSONNEL PROTECTIVE EQUIPMENT:

- A. Special facilities, devices, equipment, and similar items used by the Contractor in execution of the Work shall comply with 29 CFR Part 1910, subpart I, Part 1926, subpart E, and other applicable regulations.

2.2 HAZARDOUS AND / OR CONTAMINATED MATERIALS:

- A. The Contractor shall bring to the attention of the Commissioner, any material encountered during execution of the Work that the Contractor suspects to be hazardous and / or contaminated.
- B. The Commissioner shall determine whether the Contractor shall perform tests to determine if the material is hazardous and / or contaminated. A change to the Contract price may be provided, subject to the applicable provisions of the Contract.
- C. If the material is found to be hazardous, the Commissioner may direct the Contractor to remediate the hazard and a change to the Contract price may be provided, subject to the applicable provisions of the Contract.



PART III – EXECUTION

3.1 EMERGENCY SUSPENSION OF WORK:

- A. When the Contractor is notified by the Commissioner of noncompliance with the safety provisions of the Contract, the Contractor shall immediately, unless otherwise instructed, correct the unsafe condition, at no additional cost to the City.
- B. If the Contractor fails to comply promptly, all or part of the Work may be stopped by notice from the Commissioner.
- C. When, in the opinion of the Commissioner, the Contractor has taken satisfactory corrective action, the Commissioner shall provide written notice to the Contractor that the Work may resume.
- D. The Contractor shall not be allowed any extension of time or compensation for damages in connection with a work stoppage for an unsafe condition.

3.2 PROTECTION OF PERSONNEL:

- A. The Contractor shall take all necessary precautions to prevent injury to the public, occupants, or damage to property of others. The public and occupants includes all persons not employed by the Contractor or a subcontractor.
- B. Whenever practical, the work area shall be fenced, barricaded, or otherwise blocked off from the public or occupants to prevent unauthorized entry into the work area, in compliance with the requirements of Section 01 50 00 TEMPORARY FACILITIES, SERVICES AND CONTROLS, and including without limitation, the following:
 - 1. Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.
 - 2. Corridors, aisles, stairways, doors, and exit ways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants, or to present an unsafe condition to the public or occupants.
 - 3. Store, position and use equipment, tools, materials, scraps and trash in a manner that does not present a hazard to the public or occupant by accidental shifting, ignition, or other hazardous activity.
 - 4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers and remove refuse on a frequent regular basis acceptable to the Resident Engineer. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks or other vehicles.

3.3 ENVIRONMENTAL PROTECTION:

- A. Dispose of solid, liquid and gaseous contaminants in accordance with local codes, laws, ordinances and regulations.
- B. Comply with applicable federal, state, and local noise control laws, ordinances, and regulations, including but not limited to 29 CFR 1910.95, 29 CFR 1926.52 and NYC Administrative Code Chapter 28 of Title 15.

END OF SECTION 01 35 26



**Department of
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**SECTION 01 35 91
HISTORIC TREATMENT PROCEDURES**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 35 91

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements for the treatment of Landmark Structures and Landmark Quality Structures, as identified in the Addendum. Specific requirements are indicated in other sections of the Specifications.
- B. This Section includes, without limitation, the following:
 - 1. Storage and protection of existing historic materials
 - 2. General Protection
 - 3. Protection during use of heat-generating equipment
 - 4. Photographic Documentation
 - 5. NYC Landmarks Preservation Commission Final Approval signoffs

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION
- C. Section 01 33 00 SUBMITTAL PROCEDURES
- D. Section 01 77 00 CLOSEOUT PROCEDURES
- E. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Landmark Structure or Site: Any building or site which has been designated as a landmark, or any building or site within a landmark district, as designated by the New York City (NYC) Preservation Commission or the New York State Historic Preservation Office.
- D. Landmark Quality Structure: Any building which has been determined by the City to be of landmark quality and/or historical significance.



- E. Preservation: To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.
- F. Rehabilitation: To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.
- G. Restoration: To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.
- H. Reconstruction: To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.
- I. Stabilize: To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.
- J. Protect and Maintain: To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.
- K. Repair: To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.
- L. Replace: To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:
 - 1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
 - 2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
 - 3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.
- M. Remove: To detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- N. Remove and Salvage: To detach items from existing construction and deliver them to the City ready for reuse.
- O. Remove and Reinstall: To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.
- P. Existing to Remain or Retain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.
- Q. Material in Kind: Material that matches existing materials as much as possible, in species, cut, color, grain, and finish.

1.5 SUBMITTALS:

- A. Historic Treatment Program: Submit a written plan for each phase or process, including protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of the Work.
- B. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of the Work, submit for the Commissioner's approval a written description, including



evidence of successful use on other comparable projects and provide a program of planned testing to demonstrate the effectiveness of the alternative methods and materials for use on this Project.

- C. Qualification Data: Submit qualification data for historic treatment specialists as specified and required by individual sections of the Project specifications.
- D. Photographs for Designated Landmark Structures: Submit photographs in accordance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION and as described in this section.
- E. Record Documents: Include modifications to manufacturer's written instructions and procedures, as documented in the historic treatment preconstruction conference and as the Work progresses.

1.6 QUALITY ASSURANCE:

- A. Historic Treatment Specialist Qualifications: Refer to Section 01 40 00 QUALITY REQUIREMENTS for Qualifications for Historic Treatment Specialists.
- B. Historic Treatment Preconstruction Conference: The Resident Engineer will schedule and hold a preconstruction meeting at the site in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.
 - 1. Review manufacturer's written instructions for precautions and effects of products and procedures on building materials, components, and vegetation.
 - a. Record procedures established as a result of the review and distribute to affected parties.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS:

- A. Removed and Salvaged Historic Materials: As specified and required by individual sections of the Project specifications.
- B. Removed and Reinstalled Historic Materials: As specified and required by individual sections of the Project specifications.
- C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by the Commissioner, items may be removed to a suitable, protected storage location during historic treatment and reinstalled in their original locations after historic treatment operations are complete.
- D. Storage and Protection: When removed from their existing location, store historic materials, at a location acceptable to the Commissioner, within a weather tight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.
 - 1. Identify removed items with an inconspicuous mark indicating their original location.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 GENERAL PROTECTION:

- A. Comply with manufacturer's written precautions against harmful effects of products and procedures on adjacent building materials, components, and vegetation.
- B. Ensure that supervisory personnel are present when work begins and throughout its progress.
- C. Temporary Protection of Historic Materials during Construction:
 - 1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.



2. Attachments of temporary protection to existing construction must be approved by the Commissioner prior to installation.
- D. Protect landscape work adjacent to or within work areas as follows:
1. Provide barriers to protect tree trunks.
 2. Bind spreading shrubs.
 3. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than eight (8) hours at a time.
 4. Set scaffolding and ladder legs away from plants.
- E. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify the Commissioner immediately of drains or systems that are stopped or blocked. Do not begin Work pertaining to this Section until the drains are in working order.
1. Provide a method to prevent solids, including stone or mortar residue, from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of the Work performed under this Contract.
 2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT:

- A. No roofing work requiring the use of an open flame will be permitted on any Landmark Structure or any Landmark Quality Structure whose roof or wall structure is made of wood or primarily of wood.
- B. Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:
1. Obtain Commissioner's approval for operations involving use of open-flame or welding equipment. Notification must be given for each occurrence and location of work with heat-generating equipment.
 2. Where possible, use heat-generating equipment in shop areas or outside the building.
 3. Before work with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.
 4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 5. Remove and keep the area free of combustibles, including rubbish, paper, waste, etc., within the area of operations.
 6. If combustible material cannot be removed, provide fireproof blankets to cover such materials.
 7. Where possible, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.
 8. Prevent the extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 9. Inspect each location of the day's work not sooner than thirty (30) minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.



- C. Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to automatic sprinkler heads, shield the individual heads temporarily with guards.

3.3 PHOTOGRAPHIC DOCUMENTATION:

- A. Photographs for Designated Landmark Structures: Show existing conditions prior to any historic treatments, including one overall photograph and two close-up photographs of all areas of work affected. Show one overall photograph and two close-up photographs of all areas of work after the successful execution of all historical treatments.

3.4 NEW YORK CITY LANDMARKS PRESERVATION COMMISSION FINAL APPROVALS SIGNOFF:

- A. For all projects involving a Landmark Structure or Site, the Contractor, at the completion of the Work, must submit to the Commissioner, in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS, all documentation concerning the successful execution of all historic treatments. This must include, but not be limited to, copies of all before and after photographs of historic treatments, one copy of the Contractor's as-built drawings, copies of testing and analysis results, including cleaning, mortar analysis, pointing mortars and all other information pertaining to work performed under the NYC Landmarks Preservation Commission jurisdiction.

END OF SECTION 01 35 91



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

(No Text on This Page)



**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART I– GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Definitions
 - 2. Engineering Services
 - 3. Conflicting Requirements
 - 4. Quality Assurance
 - 5. Quality Control
 - 6. Approval of Materials
 - 7. Special Inspections (Controlled Inspection)
 - 8. Inspections by Other City Agencies
 - 9. Certificates of Approval
 - 10. Acceptance Tests
 - 11. Repair and Protection
- B. This section includes administrative and procedural requirements for quality control to assure compliance with quality requirements specified in the Contract Documents.
- C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Documents.
- D. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Documents.
- E. Provisions of this section do not limit requirements for the Contractor to provide quality assurance and quality control services required by the Commissioner or authorities having jurisdiction.
- F. Specific test and inspection requirements are specified in the individual sections of the Specifications.
- G. LEED: Refer to the Addendum to identify whether the Project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
- H. COMMISSIONING: Refer to the Addendum to identify whether the Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE. The Contractor must cooperate with the Commissioning Agent and provide whatever assistance is required.



1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- D. Section 01 33 00 SUBMITTAL PROCEDURES
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (Drawings and Specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Commissioning: A Total Quality Assurance process that includes checking the design and installation of equipment, as well as performing functional testing of the same to confirm that the installed equipment is operating and in conformance with the Contract Documents and the City's requirements.
- D. Installer/ Applicator/ Erector: Contractor or another entity engaged by Contractor as an employee or Subcontractor, to perform installation, erection, application, assembly and similar operations.
- E. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under sample Submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- F. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- G. Product Tests: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- H. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory means the same as testing agency.



- J. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- K. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements.

1.5 ENGINEERING SERVICES

- A. Performance and Design Criteria: Where professional design services provided by a professional engineer are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for clarification to the Commissioner.

1.6 CONFLICTING REQUIREMENTS:

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, the Contractor must comply with the most stringent requirement. The Contractor must refer any uncertainties and/or conflicting requirements to the Commissioner for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified must be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. The Contractor must refer any uncertainties to the Commissioner for a decision before proceeding.

1.7 QUALITY ASSURANCE:

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required. Individual Specification Sections may specify supplementary qualification requirements.
 - 1. **Minimum Experience:** Minimum Experience qualification levels as described herein, apply to all entities indicated in the Specification Sections for the Project, unless such entity requires Special Experience requirements per Subsection 1.7 A.2. below. Individual Specification Sections may specify supplementary qualification requirements.
 - 2. **Special Experience:** Special Experience qualification levels as described herein, apply to all entities indicated in the "Special Experience Requirements" page of the PASSPort procurement. Individual Specification Sections may specify supplementary qualification requirements.
- B. **Minimum Experience qualification levels:**
 - 1. **Qualifications for Installer or Applicator or Erector:** An entity complying with the requirements of authorities having jurisdiction and having, prior to the bid opening, been regularly engaged for a minimum of three (3) consecutive years in installing, erecting, applying, or assembling work in a timely fashion similar in material, design, and extent to that indicated for the Project, and whose work has resulted in construction with a record of successful in-service performance.



2. **Qualifications for Installer or Applicator or Erector requiring approval or certification or authorization by Manufacturer:** An entity complying with the requirements of authorities having jurisdiction and having, prior to the bid opening, been regularly engaged for a minimum of three (3) consecutive years in installing, erecting, applying, or assembling work in a timely fashion similar in material, design, and extent to that indicated for the Project, and whose work has resulted in construction with a record of successful in-service performance. In addition, the entity must be approved, or certified, or authorized by the manufacturers listed in the Specification Section and must be eligible to receive manufacturers' warranty.
3. **Qualifications for Fabricator:** An entity complying with the requirements of authorities having jurisdiction; having, prior to the bid opening, been regularly engaged for a minimum of three (3) consecutive years in producing products similar to those indicated for the Project and having a record of successful in-service performance, as well as sufficient production capacity to produce required units.
4. **Qualifications for Manufacturer:** An entity complying with the requirements of authorities having jurisdiction; having, prior to the bid opening, been regularly engaged for a minimum of three (3) consecutive years in manufacturing products or systems similar to those indicated for the Project; having a record of successful in-service performance for not less than three (3) consecutive years and having sufficient production capacity to produce required units. Manufacturer must meet warranty requirements and technical or factory-authorized service representative requirements.
5. **Qualifications for Specialist:** An entity complying with the requirements of authorities having jurisdiction; satisfying qualification requirements indicated in the Specification Section and having, prior to the bid opening, a minimum of three (3) consecutive years successfully engaged in the activities indicated.

C. Special Experience Qualification Levels:

1. **Special Qualifications for Installer or Applicator or Erector:** An entity complying with the requirements of authorities having jurisdiction and having, prior to the bid opening, been regularly engaged for a minimum of five (5) consecutive years in successfully installing, erecting, applying, or assembling work similar in material and design to that indicated for the Project. Entity must provide documentation of having successfully completed a minimum of three (3) projects similar in scope, size and type as required for the Project.
2. **Special Qualifications for Fabricator:** An entity complying with the requirements of authorities having jurisdiction; having, prior to the bid opening, been regularly engaged for a minimum of five (5) consecutive years in producing products similar to those indicated for the Project; having a record of successful in-service performance, as well as sufficient production capacity to produce required units. Entity must provide documentation of having successfully completed a minimum of three (3) projects similar in nature, size, and extent, to the requirements of the project.
3. **Special Qualifications for Installer of a Manufacturer-Warranted Roof System:** An entity complying with the requirements of authorities having jurisdiction; regularly engaged in performing roofing projects with its own workforce; having successfully completed in a timely fashion within the last three (3) consecutive years prior to the bid opening, at least three (3) roofing projects similar in scope, size and type to the required Project, and having performed at least one (1) of those projects in the last twelve (12) months. The three (3) qualifying projects must have utilized one or more of the roofing systems specified for the project being bid herein, been installed by the entity utilizing its own workforce and must have qualified for, and have been issued, the warranty provided by the manufacturer of the roofing system. In addition, the entity



must be a certified or authorized installer for the manufacturer's roofing systems specified herein and must submit proof of same.

4. **Special Qualifications for Installer of Roof tie-in to maintain existing Roof System**
Warranty: An entity complying with the requirements of authorities having jurisdiction; regularly engaged in performing roofing projects with its own workforce; having successfully completed in a timely fashion within the last three (3) consecutive years prior to the bid opening, at least three (3) roofing projects similar in scope, size and type to the required Project, and having performed at least one (1) of those projects in the last twelve (12) months. The three (3) qualifying projects must have utilized the manufacturer and manufacturer's Product, been installed by the entity utilizing its own workforce and must have qualified for, and have been issued, the warranty provided by the manufacturer listed in the technical specification. In addition, the entity must be a certified or authorized installer for this manufacturer's specified roofing system specified herein and must submit proof of same.
 5. **Special Qualifications for Manufacturer:** An entity complying with the requirements of authorities having jurisdiction; having, prior to the bid opening, been regularly engaged for a minimum of five (5) consecutive years in manufacturing products or systems similar to those indicated for the Project; having completed a minimum of three (3) projects similar in nature, size, and extent, to the requirements of the project; having a record of successful in-service performance, as well as sufficient production capacity to produce required units. Manufacturer must meet warranty requirements, and technical or factory-authorized service representative requirements.
 6. **Special Qualifications for Historic Treatment Specialist:** An entity complying with the requirements of authorities having jurisdiction and having prior to the bid opening, been regularly engaged for a minimum of five (5) consecutive years in successfully completing in a timely fashion projects similar in scope, size, and type to the required work, based on architectural style, construction method and materials and age of building for the project. Entity must provide documentation of having successfully completed a minimum of three (3) projects similar in scope, size and type as required for the Project, and where at least one (1) such prior project of the three (3) must have involved a landmarked building, as officially designated by the City, State, or Federal government.
- D. **Professional Engineer Qualifications:** A professional engineer who is licensed and registered to practice in the State of New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for the Project in material, design, and extent.
 - E. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for the Project.
 - F. **Testing Agency Qualifications:** A Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329 (Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection); and with additional qualifications specified in individual Specification Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - G. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. Contractor responsibilities include the following:



- a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens and test assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibility: Submit a certified written report of each test, inspection, and similar quality-assurance service to Commissioner, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by the Commissioner.
 2. Notify Commissioner seven (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Commissioner's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise directed or indicated.
- I. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings or as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph in this Section.
- J. Room Mockups: Construct room mockups according to approved Shop Drawings or as indicated on Drawings, incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Commissioner to evaluate quality of the Work. Comply with requirements in "Mockups" Paragraph in this Section.
- K. Laboratory Mockups: Comply with the requirements of preconstruction testing and those specified in individual Specification Sections.

1.8 QUALITY CONTROL:

- A. City's Responsibilities: Where quality-control services are indicated as the City's responsibility in the Specifications, the City will engage a qualified testing agency to perform these services. (Refer to Special Inspections Article 1.10.)
1. COST OF TESTS BORNE BY THE CITY: Where the City directs tests to be performed to determine compliance with the Specifications regarding materials or equipment, and where such compliance is ascertained as a result thereof, the City will bear the cost of such tests.
 2. The City will furnish the Contractor with names, addresses, and telephone numbers of testing entities engaged and a description of the types of testing and inspecting they are engaged to perform.



3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.
- B. Contractor's Responsibility: Tests and inspections not explicitly assigned to the City are the Contractor's responsibility. Unless otherwise indicated, the Contractor must provide quality control services as set forth in the Specifications and those required by authorities having jurisdiction, whether specified or not.
1. **COST OF TESTS BORNE BY CONTRACTOR** – In the case of tests which are specifically called for in the Specifications to be provided by the Contractor or tests which are required by any authority having jurisdiction, but are not indicated as the responsibility of the City, the cost thereof will be borne by the Contractor and will be deemed to be included in the Contract price. The Contractor must reimburse the City for expenditures incurred in providing tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.
 2. Where services are indicated as Contractor's responsibility, the Contractor must engage a qualified testing agency to perform these quality-control services. Any testing agency engaged by the Contractor to perform quality control services is subject to prior approval by the Commissioner.
 3. The Contractor must not employ same entity engaged by the City, unless agreed to in writing by the Commissioner.
 4. The Contractor must notify testing agencies and the Commissioner at least 72 hours in advance of the date and time for the performance of Work that requires testing or inspecting.
 5. Where quality control services are indicated as Contractor's responsibility, the Contractor must submit a certified written report of each quality-control service, in triplicate, to the Commissioner.
 6. Testing and inspecting requested by the Contractor and not required by the Contract Documents are Contractor's responsibility.
 7. The Contractor must submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, the Contractor must engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Results must be submitted in writing as specified in Section 01 33 00 SUBMITTAL PROCEDURES. Manufacturer's field representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Re-inspecting: Regardless of whether the original tests or inspections were the Contractor's responsibility, the Contractor must provide quality control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Commissioner and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Commissioner and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- F. Associated Services: The Contractor must cooperate with entities performing required tests, inspections, and similar quality control services, and must provide reasonable auxiliary services as requested. The



Contractor must notify the testing agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist testing entity in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing entities.
 6. Design mix proposed for use for material mixes that require control by the testing entity.
 7. Security and protection for samples and for testing and inspecting equipment at the Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimal delay and avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
 2. Coordinate and cooperate with the Commissioning Authority/Agent as applicable for start-up, inspection and functional testing in the implementation of the Commissioning Plan.
- H. Manufacturer's Directions: Where the Specifications provide that the manufacturer's directions are to be used, such printed directions must be submitted to the Commissioner.
- I. Inspection of Material: In the event that the Specifications require the Contractor to engage the services of an entity to witness and inspect any material especially manufactured or prepared for use in or part of the permanent construction, such entity will be subject to prior written approval by the Commissioner.
1. NOTICE - The Contractor must give notice in writing to the Commissioner, sufficiently in advance of its intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice must contain a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or the Commissioner will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or the Commissioner will notify the Contractor that inspection will be waived.
- J. No Shipping Before Inspection: The Contractor must comply with the foregoing before shipping any material.
- K. Certificate of Manufacture: When the Commissioner so requires, the Contractor must furnish to the Commissioner, authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Specifications. These certificates must include copies of the results of physical tests and chemical analyses where necessary, that have been made directly on the product, or on similar products being fabricated by the manufacturer. This may include such approvals as the Bureau of Standards and Appeals (B.S.A.), the Materials and Equipment (M.E.A.) acceptance Index, the Bureau of Electrical Control (B.E.C.), etc.
- L. Acceptance: When materials or manufactured products comprise of such quantity that it is not practical to make physical tests or chemical analyses directly on the product furnished, a certificate stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for the acceptance of such material or manufactured product.
- M. Testing Compliance: The testing personnel must make the necessary inspections and tests, and the reports thereof must be in such form as will facilitate checking to determine compliance with the Specifications, indicating thereon all analyses and/or test data and interpreted results thereof.



- N. Reports: Reports in duplicate must be submitted and authoritative certification thereof must be furnished to the Commissioner as a prerequisite for the acceptance of any material or equipment.
- O. Rejections: If, in making any test, it is ascertained by the Commissioner that the material or equipment does not comply with the Specifications, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the site or from the Work and replace it with acceptable material at no additional cost to the City.
- P. Furnish Designated Materials: Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Specifications, the Contractor must immediately proceed to furnish the designated material or equipment.

1.9 APPROVAL OF MATERIALS:

- A. Local Laws: All materials, appliances and types or methods of construction must be in accordance with the Specifications and must in no event be less than that necessary to conform to the requirements of the New York City (NYC) Construction Codes, Administrative Code and Charter of the City of New York.
- B. Approval of Manufacturer: The names of proposed manufacturers, material suppliers, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings must be submitted to the Commissioner for approval, as early as possible, to afford proper review and analysis. No manufacturer will be approved for any materials to be furnished under the Contract unless it has a plant of ample capacity and have successfully produced similar products. All approvals of materials or equipment that are legally required by the NYC Construction Codes and other governing authorities must be obtained prior to installation.
- C. All Materials: Fixtures, fittings, supplies and equipment furnished under the Contract must be new and unused, except as approved by the Commissioner, and of standard first-grade quality and of the best workmanship and design. The City of New York encourages the use of recycled products where practical.
- D. INFORMATION TO SUPPLIERS - In asking for prices on materials under any item of the Contract, the Contractor must provide the manufacturer or dealer with such complete information from the Specifications and Contract Drawings as may in any case be necessary, and in every case the Contractor must inform the manufacturer or dealer of all the General Conditions and requirements herein contained.

1.10 SPECIAL INSPECTIONS:

- A. SPECIAL INSPECTIONS:
 - 1. Inspection of selected materials, equipment, installation, fabrication, erection, or placement of components and connections made during the progress of the Work to ensure compliance with the Contract Documents and provisions of the NYC Construction Codes, will be made by a Special Inspector. The City of New York will retain the services of the Special Inspector and bear the costs for the performance of Special Inspections in compliance with NYC Construction Codes requirements or as additionally may be called for in the project specifications, except as noted below for Form TR-3: Technical Report for Concrete Design Mix. The Special Inspector will be an entity that is in compliance with the requirements of the NYC Construction Codes. The Contractor must notify the relevant Special Inspector in writing at least 72 hours before the commencement of any Work requiring special inspection.
 - 2. Form TR3: Technical Report Concrete Design Mix: The Contractor will be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.



3. The Contractor must notify the relevant Special Inspector in writing at least 72 hours before the commencement of any Work requiring Special Inspection. The Contractor will be responsible for and bear related costs to assure that all construction or work has suitable access and remains exposed for inspection purposes until the required inspection is completed.
4. Inspections and tests performed under “Special Inspection” will not relieve the Contractor of the responsibility to comply with the Contract Documents, and that there is no warranty given to the Contractor by the City of New York in connection with such inspection and tests or certifications made under “Special Inspections”.
5. The Contractor must coordinate with the Resident Engineer or DDC Project Manager to provide access and schedule the Work for inspection by the Special Inspector.

1.11 INSPECTIONS BY OTHER CITY AGENCIES:

- A. Letter of Completion: Just prior to Substantial Completion of the Project, the Commissioner will file with the Department of Buildings, an application for a Letter of Completion or a Certificate of Occupancy for the structure.
- B. Final Inspections: In connection with the above-mentioned application for a Letter of Completion or a Certificate of Occupancy and before certificates of final payments are issued, the Contractor will be required to arrange for all final inspections by the inspection staff of the Department of Buildings, Fire Department, or other Governmental Agencies having jurisdiction, and secure all reports, sign offs, certificates, etc., by such inspection staff or other governmental agencies, in order that a Letter of Completion or Certificate of Occupancy can be issued promptly.

1.12 CERTIFICATES OF APPROVAL:

- A. Responsibility: The Contractor will be responsible for and must obtain all final approvals for the Work installed under the Contract in the form of such certificates that are required by all governmental agencies having jurisdiction over the Work of the Contract.
- B. Transmittal: All such certificates must be forwarded to the DDC.

1.13 ACCEPTANCE TESTS:

- A. Government Agencies: All equipment and appliances furnished and installed under the Contract must conform to the requirements of the Specifications and will in no event be less than that necessary to comply with the minimum requirements of the law and all of the governmental agencies having jurisdiction.
- B. Notice of Tests: Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor will give to all concerned, written notice of the time when these tests will be conducted.
- C. Energy: The City will furnish all energy, fuel, water, and light required for tests.
- D. Labor and Materials: The Contractor must furnish labor and all other material and instruments necessary to conduct the acceptance tests at no additional cost to the City.
- E. Certificates: The Final Acceptance by the Commissioner will be contingent upon the Contractor delivering to the Commissioner all necessary certificates evidencing compliance in every respect with the requirements of the regulatory agencies having jurisdiction.
- F. Results: If the results of tests and Special Inspections indicate that the material or procedures do not meet requirements as set forth on the Contract Drawings or in the Specifications or are otherwise unsatisfactory, the Contractor must only proceed as directed by the Commissioner. Additional costs resulting from retesting, re-inspecting, replacing of material and/or damage to the Work and any delay caused to the schedule will be borne by the Contractor.



PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, the Contractor must repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

END OF SECTION 01 40 00



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**SECTION 01 42 00
REFERENCES**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 DEFINITIONS:

REFER TO THE ADDENDUM, Article IX, FOR ADDITIONAL DEFINITIONS AND REVISIONS TO THE CONTRACT AND SPECIFICATIONS

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. "APPROVED," ETC. - "Approved," "acceptable," "satisfactory," and words of similar import will mean and intend approved, acceptable, or satisfactory to the Commissioner.
- C. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- D. "DIRECTED," "REQUIRED," ETC.- Wherever reference is made in the Contract to the Work or its performance, the terms "directed," "required," "permitted," "ordered," "designated," "prescribed," "determined," and words of similar import will, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.
- E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.



1.3 CODES, AGENCIES AND REGULATIONS:

A.B.A	Architectural Barriers Act
A.D.A.A.G.	Americans with Disabilities Act (ADA) Accessibility Guidelines
B.G. & E.	Bureau of Gas and Electricity of the City of New York
B.S. A.	New York City Board of Standards and Appeals
DOE	Department of Energy
E.C.C.C.N.Y.S.	Energy Conservation Construction Code of New York State
EPA	Environmental Protection Administration
N.Y.C.C.C.	New York City Construction Codes
N.Y.C.P.C.	New York City Plumbing Code
N.Y.C.B.C.	New York City Building Code
N.Y.C.M.C.	New York City Mechanical Code New York
N.Y.C.F.G.C.	New York City Fuel Gas Code
N.Y.S. D.O.L	New York State Department of Labor
N.Y.C.D.O.B.	New York City Department of Buildings
N.Y.C.D.E.P.	New York City Department of Environmental Protection
N.Y.C.D.O.T.	New York City Department of Transportation
N.Y.C.E.C.	New York City Electrical Code
N.Y.C.E.C.C	New York City Energy Conservation Code
N.Y.C.F.C.	New York City Fire Code
N.Y.S...D.E.C.	New York State Department of Environmental Conservation
O.S.H.A.	Occupational Safety & Health Administration

1.4 INDUSTRY STANDARDS:

- A. STANDARD REFERENCES – Unless otherwise specifically indicated in the Contract Documents, whenever reference is made to the furnishing of materials or testing thereof that conforms to the standards of any technical society, organization or body, it must be construed to mean the latest standard, code, specification adopted and published by that technical society, organization or body, as of the date of the bid opening, unless the provisions of the N.Y.C.C.C. adopts a different or earlier dated version of such standard. All references to the ICC A117.1 are only to the 2009 version, whether or not a specific version is specified.
- B. APPLICABILITY OF STANDARDS: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect, to the extent referenced, as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.
- C. CONFLICTING REQUIREMENTS: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantity or quality, comply with the most stringent requirements. Immediately refer uncertainties and requirements that are different but apparently equal, to the Commissioner in writing for a decision before proceeding.



- D. STANDARD SPECIFICATIONS - When no reference is made to a code, standard, or specification, the Standard Specifications of the ASTM or the AIEE, as the case may be, shall govern.
- E. REFERENCES - Reference to a technical society, organization, or body may be made in the Specifications by abbreviations. Abbreviations and acronyms used in the Specifications and other Contract Documents mean the associated name. The following names are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the Issue Date of the Contract Documents.

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AAPFCO	Association of American Plant Food Control Officials
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists (The)
ABAA	Air Barrier Association of America
ABMA	American Bearing Manufacturers Association
ACI	ACI International (American Concrete Institute)
ACAC	American Council for Accredited Certification
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies, Inc. (The)
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AGMA	American Gear Manufacturer Association
AHA	American Hardboard Association (Now part of CPA)
AHAM	Association of Home Appliance Manufacturers



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AI	Asphalt Institute
AIA	American Institute of Architects (The)
AIEE	American Institute of Electrical Engineers
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)
ALSC	American Lumber Standard Committee, Incorporated
ALI	Automotive Lift Institute
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts, Inc.
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE/SEI	American Society of Civil Engineers, Structural Engineering Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering



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ASTM	ASTM International (Formerly: American Society for Testing and Materials)
AWCI	Association of the Wall and Ceiling Industry
AWCMA	American Window Covering Manufacturers Association (Now WCSC)
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWSC	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BICSI	Building Industry Consulting Services International
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International)
BISSC	Baking Industry Sanitation Standards Committee
CIBSE	Chartered Institute of Building Services Engineers
CCC	Carpet Cushion Council
CDA	Copper Development Association
CEA	Consumer Electronics Association
CESB	Council of Engineering and Scientific Specialty Boards
CFFA	Chemical Fabrics & Film Association, Inc.
CFSEI	Cold-Formed Steel Engineers Institute
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CIMA	Cellulose Insulation Manufacturers Association
CIPRA	Cast Iron Pipe Research Association



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CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPA	Composite Panel Association
CPPA	Corrugated Polyethylene Pipe Association
CPSC	Consumer Product Safety Commission
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CSI	Cast Stone Institute
CSI	Construction Specifications Institute (The)
CSSA	Certified Steel Stud Association
CSSB	Cedar Shake & Shingle Bureau
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute)
DASMA	Door and Access Systems Manufacturer's Association International
DHI	Door and Hardware Institute
DOC	U.S. Department of Commerce – National Institute of Standards and Technology
EIA	Electronic Industries Alliance
DOJ	U.S. department of Justice
EIMA	EIFS Industry Members Association
DOL	U.S. Department of labor
EJCDC	Engineers Joint Contract Documents Committee



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DOTn	U.S. Department of Transportation
EN	European Committee of Standards
EJMA	Expansion Joint Manufacturers Association, Inc.
ESD	ESD Association
EVO	Efficiency Valuation Organization
FEMA	Federal Emergency Management Agency
FIBA	Federation Internationale de Basketball Amateur (The International Basketball Federation)
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation)
FMG	FM Global (Formerly: FM - Factory Mutual System)
FMRC	Factory Mutual Research (Now FMG)
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.
FSA	Fluid Sealing Association
FSC	Forest Stewardship Council
GA	Gypsum Association
GANA	Glass Association of North America
GRI	(Now GSI)
GS	Green Seal
GSI	Geosynthetic Institute
HI	Hydraulic Institute
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)
HPVA	Hardwood Plywood & Veneer Association
HPW	H. P. White Laboratory, Inc.



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HUD	U.S. Department of Housing and Urban Development
IAPMO	International Association of Plumbing and Mechanical Officials
IAS	International Approval Services (Now CSA International)
IBF	International Badminton Federation
ICC	International Code Council, Inc.
ICEA	Insulated Cable Engineers Association, Inc.
ICRI	International Concrete Repair Institute, Inc.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA	Illuminating Engineering Society of North America
IEST	Institute of Environmental Sciences and Technology
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance
IICRC	Institute of Inspection, Cleaning, and Restoration
ILIA	Indiana Limestone Institute of America, Inc.
IPEMA	International Play Equipment Manufacturers Association
ISA	International Society of Arboriculture
ISO	International Organization for Standardization
ISSFA	International Solid Surface Fabricators Association
ITS	Intertek
ITU	International Telecommunication Union
KCMA	Kitchen Cabinet Manufacturers Association
LMA	Laminating Materials Association (Now part of CPA)



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LPI	Lightning Protection Institute
MBMA	Metal Building Manufacturers Association
MFMA	Maple Flooring Manufacturers Association, Inc.
MFMA	Metal Framing Manufacturers Association
MH	Material Handling (Now MHIA)
MHIA	Material Handling Industry of America
MIA	Marble Institute of America
MIL	Military Specification Standards of the US Dept of Defense
MPEG	Moving Picture Experts Group
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International (National Association of Corrosion Engineers International)
NADCA	National Air Duct Cleaners Association
NAGWS	National Association for Girls and Women in Sport
NAIMA	North American Insulation Manufacturers Association
NBA	National Basketball Association
NBGQA	National Building Granite Quarries Association, Inc.
NCAA	National Collegiate Athletic Association (The)
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NCTA	National Cable & Telecommunications Association
NEBB	National Environmental Balancing Bureau



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NECA	National Electrical Contractors Association
NeLMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFHS	National Federation of State High School Associations
NFPA	NFPA (National Fire Protection Association)
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NICET	National Institute for Certification in Engineering Technologies
NLGA	National Lumber Grades Authority
NIS	National Institute of Standards and Technology
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association)
NRCA	National Roofing Contractors Association
NRDCA	National Roof Deck Association
NRMCA	National Ready Mixed Concrete Association
NSI	Natural Stone Institute
NSF	NSF International (National Sanitation Foundation International)
NSSGA	National Stone, Sand & Gravel Association
NTMA	National Terrazzo & Mosaic Association, Inc. (The)
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)
NWWDA	National Wood Window and Door Association (Now WDMA)
OPL	Omega Point Laboratories, Inc. (Acquired by ITS - Intertek)



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PCI	Precast / Pre-stressed Concrete Institute
PDCA	Painting & Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America)
PPS	Power Piping Society
PTI	Post-Tensioning Institute
RCSC	Research Council on Structural Connections
RFCI	Resilient Floor Covering Institute
RIS	Redwood Inspection Service
RMI	Rack Manufacturers Institute
RTI	(Formerly: NTRMA - National Tile Roofing Manufacturers Association) (Now TRI)
RUS	Rural Utilities Service, Department of Agriculture
SAE	SAE International
SCAQMD	South Coast Air Quality Management District
SCS	Scientific Certification System
SDI	Steel Deck Institute
SDI	Steel Door Institute
SEFA	Scientific Equipment and Furniture Association
SGCC	Safety Glazing Certification Council
SHBI	Steel Heating Boiler Institute
SIA	Security Industry Association
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)



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SFIA	Steel Framing Industry Association
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SMPTE	Society of Motion Picture and Television Engineers
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)
SPIB	Southern Pine Inspection Bureau (The)
SPRI	Single Ply Roofing Industry
SSINA	Specialty Steel Industry of North America
SSMA	the Steel Stud Manufacturers Association
SSPC	SSPC: The Society for Protective Coatings
SSSA	Soil Science Society of America
STI	Steel Tank Institute
SWI	Steel Window Institute
SWRI	Sealant, Waterproofing, & Restoration Institute
TABB	Testing, Adjusting, and Balancing Bureau
TCA	Tile Council of America, Inc.
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TMS	The Masonry Society
TPI	Truss Plate Institute, Inc.
TPI	Turfgrass Producers International
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute)
UL	Underwriters Laboratories Inc.



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ULC	Underwriters Laboratories of Canada
UNI	Uni-Bell PVC Pipe Association
USAV	USA Volleyball
USC	United States Code
USGBC	U.S. Green Building Council
USITT	United States Institute for Theatre Technology, Inc.
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (Now WCSC)
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)
WNBA	Women's National Basketball Association
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California)
WIC	Woodwork Institute of California (Now WI)
WMMPA	Wood Moulding & Millwork Producers Association
WRI	Wire Reinforcement Institute, Inc.
USEPA	United States Environmental Protection Agency
WSRCA	Western States Roofing Contractors Association
WWPA	Western Wood Products Association

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 42 00



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**SECTION 01 50 00
TEMPORARY FACILITIES, SERVICES AND CONTROLS**

PART I– GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Temporary Water System
 - 2. Temporary Sanitary Facilities
 - 3. Temporary Electric Power, Temporary Lighting System, and Site Security Lighting
 - 4. Temporary Heat
 - 5. Dewatering Facilities and Drains
 - 6. Temporary Field Office for Contractor
 - 7. DDC Field Office
 - 8. Material Sheds
 - 9. Temporary Enclosures
 - 10. Temporary Partitions
 - 11. Temporary Fire Protection
 - 12. Work Fence Enclosure
 - 13. Rodent and Insect Control
 - 14. Plant Pest Control Requirements
 - 15. Project Identification Signage
 - 16. Project Construction Sign and Rendering
 - 17. Security Guards/Fire Guards on Site
 - 18. Safety

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 42 00 REFERENCES
- C. Section 01 54 11 TEMPORARY ELEVATORS AND HOISTS
- D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING
- E. Section 01 77 00 CLOSE OUT PROCEDURES

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.



<u>Term</u>	<u>Definition</u>
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Permanent Enclosure	As determined by the Commissioner, permanent or temporary roofing that is complete, insulated, and weather tight; exterior walls which are insulated and weather tight; and all openings that are closed with permanent construction or substantial temporary closures.

1.5 SUBMITTALS:

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Reports: Submit reports of tests, inspections, meter readings and similar procedures for temporary use.

1.6 PROJECT CONDITIONS:

- A. Temporary Use of Permanent Facilities and Services: The Contractor will be responsible for the operation, maintenance, and protection of each permanent facility and service during its use as a construction facility before Final Acceptance by the City, regardless of previously assigned responsibilities.
- B. The Contractor must install, operate, maintain and protect temporary facilities, services, and controls, including without limitation:
 - 1. Keep temporary services and facilities clean and neat in appearance;
 - 2. Operate temporary services in a safe and efficient manner;
 - 3. Relocate temporary services and facilities as needed as Work progresses;
 - 4. Do not overload temporary services and facilities or permit them to interfere with progress;
 - 5. Provide necessary fire prevention measures; and
 - 6. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on-Site.

1.7 NON-REGULAR WORK HOURS (OVERTIME):

- A. The Contractor must provide the temporary services, facilities and controls set forth in this section during non-regular working hours if the Contract Drawings and/or the Specifications indicate that the Work, or specific components thereof, must be performed during non-regular working hours. In such case, all costs for the provision of temporary services, facilities and controls during non-regular working hours will be deemed included in the total Contract price.
- B. The Contractor must provide the temporary services, facilities and controls set forth in this section during non-regular working hours if a change order is issued directing the Contractor to perform the Work, or specific components thereof, during non-regular working hours. In such case, compensation for the provision of temporary services, facilities and controls during non-regular working hours will be provided



through the change order.

1.8 SERVICES BEYOND COMPLETION DATE:

- A. The Contractor must provide the temporary services, facilities and controls set forth in this section until the date on which it completes all required Work at the Site, including all Final Approved Punch List Work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor must provide such temporary services, facilities and controls even if completion of all required Work at the Site occurs after the time fixed for such completion in Schedule A.

PART II – PRODUCTS

2.1 MATERIALS:

- A. The Contractor must provide undamaged materials in serviceable condition and suitable for use intended.
- B. Tarpaulins: Waterproof, fire-resistant UL labeled with flame spread rating of fifteen (15) or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- C. Water: Potable and in compliance with requirements of the New York City Department of Environmental Protection (DEP).

2.2 EQUIPMENT:

- A. The Contractor must provide undamaged equipment in serviceable condition and suitable for use intended.
- B. Water Hoses: Heavy-duty abrasive-resistant flexible rubber hoses, one hundred (100) feet (thirty (30) m) long with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electric Power Cords: Grounded extension cords.
 - 1. Provide hard-service cords where exposed to abrasion or traffic.
 - 2. Provide waterproof connectors to connect separate lengths of electric cords where single lengths do not reach areas of construction Activity.
 - 3. Do not exceed safe length-voltage ratio.
- D. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART III –EXECUTION:

3.1 INSTALLATION, GENERAL:

- A. The Contractor must locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. The Contractor must provide each facility ready for use when needed to avoid delay. The Contractor must not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities as approved by the Resident Engineer.



3.2 TEMPORARY WATER SYSTEM:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2 A

- A. TEMPORARY WATER SYSTEM - NEW FACILITIES: During construction, the Contractor must furnish a Temporary Water System as set forth below.
1. Immediately after the Commissioner has issued an order to start the Work, the Contractor must file an application with DEP for the schedule of charges for water use during construction. The Contractor will be responsible for payment of water charges.
 2. Immediately after the Commissioner has issued an order to start the Work, the Contractor must file an application with DEP's Bureau of Water Supply and obtain a permit to install the temporary water supply system. The system must be installed and maintained for the use of the Contractor and its subcontractors. A copy of the above-mentioned permit must be filed with the Commissioner. The Contractor must provide temporary water main, risers and waste stacks as directed and install on each floor, outlets with two (2) 3/4" hose valve connections over a barrel installed on a steel pan. The Contractor must provide drains from the pans to the stack and house sewer and hose bibs to drain the water supply risers and mains. During winter months, the Contractor must take the necessary precautions to prevent the temporary water system from freezing. The Contractor must provide repairs to the temporary water supply system for the duration of the Project until said temporary system is dismantled and removed.
 3. Disposition of Temporary Water System: The Contractor will be responsible for dismantling the temporary water system when no longer required for the construction operations, or when replaced by the permanent water system installed for the Project, or as otherwise directed by the Resident Engineer. All repair work resulting from the dismantling of the temporary water system will be the responsibility of the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2 B

- B. TEMPORARY WATER SYSTEM – PROJECTS IN EXISTING FACILITIES:
1. When approved by the Commissioner, use of existing water system will be permitted for temporary water service during construction, as long as the system is cleaned and maintained in a condition acceptable to the Commissioner. At Substantial Completion, the Contractor must restore the existing water system to conditions existing before initial use.
 2. The Contractor will be responsible for all repairs to the existing water system permitted to be used for temporary water service during construction. The Contractor will be responsible to maintain the existing system in a clean condition on a daily basis, acceptable to the Commissioner.
 3. The Contractor will be responsible for payment of water charges as directed by the Commissioner. Billing will be in accordance with the New York City Water Board Water and Wastewater Rate Schedule.
- C. WASH FACILITIES: The Contractor must install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition, including without limitation:
1. Dispose of drainage properly;
 2. Supply cleaning compounds appropriate for each condition; and
 3. Include safety showers, eyewash fountains and similar facilities for the convenience, safety and sanitation of personnel.
- D. DRINKING WATER FACILITIES: The Contractor must provide drinking water fountains or containerized tap-dispenser bottled-drinking water units, complete with paper cup supplies. Where power is available, provide



electric water coolers to maintain dispensed water temperature at forty-five (45) to fifty-five (55) deg. F (7 to 13 deg. C).

3.3 TEMPORARY SANITARY FACILITIES:

- A. The Contractor must provide toilets, wash facilities, and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities. Provide toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility, and provide covered waste containers for used materials.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3 B

B. SELF-CONTAINED TOILET UNITS:

1. The Contractor must provide temporary single-occupant toilet units of the chemical, aerated recirculation, or combustion type for use by all construction personnel. Units must be properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Quantity of toilet units must comply with the latest Occupational Safety and Health Administration (OSHA) regulations.
2. Toilets: The Contractor must install separate, self-contained toilet units for male and female personnel. Shield toilets to ensure privacy.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3 C

C. EXISTING TOILETS:

1. TOILET FACILITIES: When approved by the Commissioner, the Contractor must arrange for the use of existing toilet facilities by all personnel during the execution of the Work. The Contractor will be responsible to clean and maintain facilities in a condition acceptable to the Resident Engineer and, at Substantial Completion, to restore facilities to the condition at the time of initial use.
2. MAINTENANCE - The Contractor must maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs.
3. NUISANCES - The Contractor must not cause any sanitary nuisance to be committed by its employees or the employees of its subcontractors in or about the Work and must enforce all sanitary regulations of the City and State Health Authorities.

3.4 TEMPORARY ELECTRIC POWER, TEMPORARY LIGHTING SYSTEM, AND SITE SECURITY LIGHTING:

- A. SCOPE: This section sets forth the General Conditions and procedures relating to Temporary Electric Power, Temporary Lighting System, and Site Security Lighting during the construction period.
- B. TEMPORARY ELECTRIC POWER: The Contractor must provide and maintain a temporary electric power service and distribution system of sufficient size, capacity and power characteristics required for construction operations for all required Work by the Contractor and its subcontractors, including but not limited to, power for the temporary lighting system, site security lighting, construction equipment, hoists, temporary elevators and all field offices. temporary electric power must be provided as follows:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (1)

1. CONNECTION TO UTILITY LINES:

- a. Temporary electric power service for use during construction must be provided as follows: The Contractor must make all necessary arrangements with the public utility company and pay all charges for the Temporary Electric Power system. The Contractor must include in its total Contract price any charges for temporary electric power, including charges that may be made



- by the public utility company for extending its electrical facilities, and for making final connections. The Contractor will make payment directly to the public utility company.
- b. **APPLICATIONS FOR METER:** The Contractor must complete an application to the public utility company and sign all documents necessary for, and pay all charges incidental to, the installation of a watt hour meter or meters for Temporary Electric Power. The Contractor must pay to the public utility company all bills for temporary electric energy used throughout the Work as they become due.
 - c. **SERVICE AND METERING EQUIPMENT:** The Contractor must furnish and install, at a suitable location on the Site, approved service and metering equipment for the Temporary Electric Power System, ready for the installation of the public utility company's metering devices. The temporary service mains to and from the metering location must not be less than one hundred (100) Amperes, 3-phase, 4-wire and must be of sufficient capacity to take care of all demands for all construction operations and must meet all requirements of the New York City Electrical Code.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (2)

- 2. **CONNECTION TO EXISTING ELECTRICAL POWER SERVICE:**
 - a. When approved by the Commissioner, electrical power service for the temporary lighting system and for the operation of small tools and equipment less than ¼ horsepower may be taken from the existing electric distribution system if the existing system is of adequate capacity for the temporary power load. The Contractor must cooperate and coordinate with the facility custodian, so as not to interfere with the normal operation of the facility.
 - b. There will be no charge to the Contractor for the electrical energy consumed.
 - c. The Contractor must provide, maintain and pay all costs for separate temporary electric power for any temporary power for equipment larger than 1/4 horsepower. When directed by the Commissioner, the Contractor must remove its own temporary power system.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (3)

- 3. **ELECTRICAL GENERATOR POWER SERVICE:**
 - a. When connection to utility lines or existing facility electric service is not available or is not adequate to supply the electric power need for construction operations, the Contractor must provide self-contained generators to provide power beyond that available.
 - b. Pay for all energy consumed in the progress of the Work, exclusive of that available from the existing facility or utility company.
 - c. Provide for control of noise from the generators.
 - d. Comply with the Ultra Low Sulfur Fuel in Non-Road Vehicles requirements as set forth in Article 5.4 of the Contract.
- C. **USE OF COMPLETED PORTIONS OF THE ELECTRICAL WORK:**
 - 1. **USE OF MAIN DISTRIBUTION PANEL:** As soon as the permanent electric service feeders and equipment metering equipment and main distribution panel are installed and ready for operation, the Contractor must have the temporary lighting and power system changed over from the temporary service points to the main distribution panel.
 - 2. **COST OF CHANGE OVER:** The Contractor will be responsible for all costs due to this change over of service and it must also make application to the public utility company for a watt hour meter to be set on the permanent meter equipment.



3. The requirements for temporary electric power service specified herein must be adhered to after change over of service until Final Acceptance of the Project.
4. **NO EXTRA COST:** The operation of the service and switchboard equipment will be under the supervision of the Contractor, but this will in no way be interpreted to mean the acceptance of such part of the installation or relieve the Contractor from its responsibility for the complete Work or any part thereof. There will be no additional charge for supervision by the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 D

D. TEMPORARY LIGHTING SYSTEM:

1. The Contractor must provide adequate service for the temporary lighting system, or a minimum of one hundred (100) Amperes, 3-phase, 4-wire service for the temporary lighting system, whichever is greater, and make all necessary arrangements with the public utility company and pay all charges by them for the Temporary Lighting System.
2. The Contractor must furnish and connect to the metered service point a Temporary Lighting System to illuminate the entire area where Work is being performed and points adjacent to the Work, with separately fused circuits for stairways and bridges. Control switches for stairway circuits must be located near entrance on ground floor.
3. **ITEMS:** The Temporary Lighting System provided by the Contractor must consist of wiring, fixtures, left-hand double sockets (one (1) double socket for every 400 square feet, with one (1) lamp and one (1) three-prong outlet), lamps, fuses, locked-type guards, pigtails and any other incidental material. Additional details may be outlined in the detailed Specifications for the electrical Work. Changes may be made, provided the full equivalent of those requirements is maintained.
4. The Temporary Lighting System will be progressively installed as required for the advancement of the Work under the Contract.
5. **RELOCATION:** The cost for the relocation or extension of the original Temporary Lighting System, as required by the Contractor or its subcontractors, that is not required due to the normal advancement of the Work, as determined by the Resident Engineer, will be borne by the Contractor.
6. **PIGTAILS:** The Contractor must furnish pigtails with left-hand sockets with locked-type guards and forty (40) feet of rubber covered cable. The Contractor must furnish and distribute a minimum of three (3) complete pigtails to each subcontractor. See the detailed Electrical Specifications for possible additional pigtails required.
7. **LAMPS:** The Contractor must furnish and install one (1) complete set of lamps, including those for the trailers. Broken and burned out lamps in the temporary lighting system, DDC field office, and construction trailers must be replaced by the Contractor. All lamps must be compact fluorescent.
8. **CIRCUIT PROTECTION:** The Contractor must furnish and install Ground Fault Interruption (GFI) protection for the temporary lighting and site security lighting systems.
9. **MAINTENANCE OF TEMPORARY LIGHTING SYSTEM:**
 - a. The Contractor must maintain the Temporary Lighting System in good working order during the scheduled hours established.
 - b. The Contractor must include in its total Contract price all costs in connection with the Temporary Lighting System, including all costs for installation, maintenance and electric power.
10. **REMOVAL OF TEMPORARY LIGHTING SYSTEM:** The temporary lighting system must be removed by the Contractor when authorized by the Commissioner.



11. **HAND TOOLS:** The temporary lighting system must not be used for power purposes, except that light hand tools not larger than 1/4 horsepower may be operated from such system by the Contractor and its subcontractors.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 E

E. SITE SECURITY LIGHTING (NEW CONSTRUCTION ONLY):

1. The Contractor must furnish, install and maintain a system of site security lighting, as herein specified, to illuminate the construction Site of the Project, with the system connected to and energized from the Temporary Lighting System. All costs in connection with site security lighting will be deemed included in the total Contract price.
2. It is essential that the site security lighting system be completely installed and operating at the earliest possible date. The Contractor must direct its subcontractors to cooperate, coordinate and exert every effort to accomplish an early complete installation of the site security lighting system. If, after the system is installed and in operation, a part of the system interferes with the Work of any trade, the Contractor will be completely responsible for the expense of removing, relocating, and replacing all equipment necessary to reinstate the system to proper operating conditions.
3. The system must consist of flood lighting by pole-mounted guarded sealed-beam units. Floodlight units must be mounted sixteen (16) feet above grade. Floodlights must be spaced around the perimeter of the Site to produce an illumination level of no less than one (1) foot candle around the perimeter of the Site, as well as in any potentially hazardous area or any other area within the Site that might be deemed by the Resident Engineer to require security illumination. The system must be installed in a manner acceptable to the Resident Engineer. The first lighting unit in each circuit must be provided with a photoelectric cell for automatic control. The photoelectric cell must be installed as per manufacturer's recommendations.
4. All necessary poles must be furnished and installed by the Contractor.
5. The site security lighting must be kept illuminated at all times during the hours of darkness. The Contractor must, at its own expense, keep the system in operation and must furnish and install all material necessary to replace all damaged or burned out parts.
6. The Contractor must be on telephone call alert for maintaining the system during the operating period stated above.
7. All materials and equipment furnished under this section will remain the property of the Contractor and must be removed and disposed of by the Contractor when authorized in writing by the Resident Engineer.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.5

3.5 TEMPORARY HEAT:

A. GENERAL:

1. **Definition:** The provision of Temporary Heat means the provision of heat in order to permit construction to be performed in accordance with the Progress Schedule during all seasons of the year and to protect the Work from the harmful effects of low temperature. In the event the building, or any portion thereof, is occupied during construction, the provision of Temporary Heat will include the provision of heat to permit normal operations in such occupied areas.
 - a. The provision of Temporary Heat must be in accordance with the temperature requirements set forth in sub-section 3.5 C herein.
 - b. The provision of Temporary Heat must include the provision of: 1) all fuel necessary and required, 2) all equipment necessary and required, and 3) all operating labor necessary and required.



- required. Operating labor must mean that minimum force required for the safe day-to-day operation of the system for the provision of Temporary Heat and must include, without limitation, heating maintenance labor and/or fire watch as required by New York City Fire Department (FDNY) regulations. Operating labor may be required seven (7) days per week and during non-regular working hours, for the period of time required by seasonal weather conditions.
- c. In the event the building, or any portion thereof, is occupied and the Project involves the replacement, modification, and/or shut down of the permanent heating system, or any key component thereof, and such system is a combined system which furnishes domestic hot water for the building occupants, the provision of Temporary Heat must include the provision of domestic hot water at the same temperature as the system which is being replaced. Domestic hot water must be provided in accordance with the phasing requirements set forth in the Contract Documents.
2. Responsibility: The Contractor's responsibility for the provision of Temporary Heat, including all expenses in connection therewith, is as set forth below:
- a. Projects involving enclosure of the building:
 - 1) Prior to Enclosure: Until the Commissioner determines that the building has been enclosed, as set forth in sub-section 3.5 B, the Contractor is responsible for the provision of Temporary Heat.
 - 2) Post Enclosure: Once the Commissioner determines that the building, or any portion thereof, has been enclosed, as set forth in sub-section 3.5 B, the Contractor is responsible for the provision of Temporary Heat by one or more of the following means: 1) by an existing heating system (if any), 2) by a permanent heating system which is being installed as part of the Project, or 3) by a temporary heating system(s).
 - 3) The Contractor must, within two (2) weeks of the kick-off meeting, submit to DDC for review its proposed plan to provide Temporary Heat. Such plan is subject to approval by the Resident Engineer. The Contractor must provide Temporary Heat in accordance with the approved plan until written acceptance by the Commissioner of the Work of all subcontractors, including punch list Work, unless directed otherwise in writing by the Commissioner. The responsibility of the Contractor provided for herein is subject to the exception set forth in sub-section 3.5 A.2 (b) herein.
 - b. Projects not involving enclosure of the building:
 - 1) If the Project involves the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, the Contractor will be responsible for the provision of Temporary Heat, except as otherwise provided in sub-section 3.5 H.3(b).2 herein.
 - 2) If the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, there is no Contractor responsibility of the provision of Temporary Heat, unless otherwise specified in the Contract Documents. However, if the Commissioner, pursuant to sub-section 3.5 H.3 (b).1 herein, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor will be responsible for the provision of Temporary Heat and must be paid for the same in accordance with sub-section 3.5 H.3 (b).1 herein.



B. ENCLOSURE OF STRUCTURES:

1. Notification: The Contractor must notify all its subcontractors and the Resident Engineer at least thirty (30) Days prior to the anticipated date that the building(s) will be enclosed.
2. Commissioner Determination: The Commissioner will determine whether the building, or any portion thereof, has been enclosed. As indicated in sub-section 3.5 A.2 above, once the building has been enclosed, the Contractor will be responsible for the provision of Temporary Heat. The Commissioner's determination with respect to building enclosure will be based upon all relevant facts and circumstances, including without limitation, 1) whether the building meets the criteria set forth in Paragraph 3 below, and 2) whether the openings in the building, such as doorways and windows, have been sufficiently covered so as to provide reasonable heat retention and protection from the elements.
3. Criteria for enclosure:
 - a. Roof Area:
 - 1) A building will be considered to be roofed when the area to be roofed is covered by a permanent structure and all openings through the permanent structure are covered and protected by temporary covers as described in Paragraph (c) below.
 - 2) Intermediate floor structures of multi-floor buildings will be considered to be roofed subject to the same requirements of the building roof.
 - 3) The final roofing system need not be in place for the building or structure to be determined to be enclosed, provided, however, all openings through the permanent structure covering the roof must be covered and protected by temporary covers, as described in Paragraph (c) below.
 - b. Walls: For the walls to be determined to be enclosed, permanent exterior wall elements or facing material must be in place and all openings must be covered and protected by temporary covers, as described in Paragraph (c) below.
 - c. Temporary Covers: In order to be acceptable, temporary covers must be securely fixed to prevent the entrance of rain, snow and direct wind. The minimum material requirements for temporary covers are as follows: 1) minimum ten (10) millimeter plastic, 2) minimum twelve (12) ounce waterproof canvas tarpaulins, or 3) a minimum three-eighths (3/8) inch thickness exterior grade plywood.
 - d. Temporary covers for openings will be the responsibility of the Contractor and such Work will be deemed included in the Contract price.

C. TEMPERATURE REQUIREMENTS:

1. Unoccupied Buildings: The temperature requirement for the provision of Temporary Heat in unoccupied buildings will be the GREATER of the following: 1) fifty (50) degrees Fahrenheit, or 2) the temperature requirement for the particular type of Work set forth in the Contract Documents.
2. Occupied Buildings: The temperature requirement for the provision of Temporary Heat in occupied buildings, or portions thereof, will be the GREATER of the following: 1) sixty-eight (68) degrees Fahrenheit, or 2) the temperature requirement for the particular type of Work set forth in the Contract Documents.

D. DURATION:

1. The Contractor must be required to provide Temporary Heat until Final Acceptance, including all punch list work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor must be responsible for the provision of Temporary Heat for the time specified herein, regardless of any delays in completion of the Project, including delays that



result in the commencement of the provision of Temporary Heat during a season that is later than that which may have been originally anticipated. The Contractor must include in its total Contract price all expenses in connection with the provision of Temporary Heat in accordance with the requirements specified herein.

2. The total Contract duration is set forth in Schedule A of the Addendum. The table set forth below indicates the number of full heating seasons that are deemed included in various Contract durations, which are specified in CCDs. At a minimum, a full heating season must extend from October 15th to April 15th.

<u>Contract Duration</u>	<u>Full Heating Seasons Required</u>
up to 360 CCD	1 full heating season
360 to 720 CCD	2 full heating seasons
more than 720 CCD	3 full heating seasons

E. METHOD OF TEMPORARY HEAT:

1. The method of temporary heat must be in conformance with the New York City Fire Code and with all applicable laws, rules, and regulations. Prior to implementation, such method must be subject to the written approval of the Commissioner.
2. The method of temporary heat must:
 - a. Not cause the deposition of dirt or smudges upon any finished Work or cause any defacement or discoloration to the finished Work.
 - b. Not be injurious or harmful to people or materials.
 - c. Portable fueled heating devices or equipment will NOT be allowed for use as temporary heat other than construction-related curing or drying in conformance with the NYC Fire Code.
3. No open fires will be permitted.

F. TEMPORARY HEATING SYSTEM:

1. The temporary system for the provision of Temporary Heat provided by the Contractor following enclosure of the building must be complete, including, subject to provisions of paragraph E above, boilers pumps, radiators, space heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat must be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

G. COORDINATION:

1. The Contractor, in the provision of Temporary Heat, must coordinate its operations in order to insure sufficient and timely performance of all required Work, including Work performed by trade subcontractors. The Contractor must supply and pay for all water required and used in the building for the operation of the heating system(s) for the purpose of Temporary Heat. The Contractor must include all expenses in connection with the supply of water for Temporary Heat in its total Contract price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained, the Contractor must provide proper ventilating and drying, open and close the windows and other openings when necessary for the proper execution of the Work and when directed by DDC. The Contractor must maintain all permanent or temporary enclosures at its own expense.

H. USE OF PERMANENT HEATING SYSTEMS:

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure:



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
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- a. The Contractor must provide all labor and materials to promptly furnish and set all required equipment, convectors and/or radiators, piping, valves, fitting, etc., in ample time for their use for the provision of Temporary Heat after enclosure of the building.
 - b. New portions of the permanent heating system that are used for furnishing Temporary Heat must be left in near-perfect condition when delivered to the City for operation. Any repairs required, other than for ordinary wear and tear on the equipment, must be made by the Contractor at his/her expense. The starting date for the warranty or guarantee period for such equipment must be the date of Substantial Completion acceptance.
 - c. In the event that the Contractor does not advance the installation of the permanent heating system in sufficient time to permit its use for Temporary Heat as determined by DDC, the Contractor must furnish and install a separate system for the provision of Temporary Heat as required to maintain the minimum temperature requirements set forth in Paragraph C above.
2. All equipment for the system for the provision of Temporary Heat must be placed so as to comply with the requirements specified hereinbefore, and must be connected, disconnected and suitably supported and located so as to permit construction Work, including finish Work such as wall plastering and painting, to proceed. The installation of the system for the provision of Temporary Heat by the Contractor, including the placing of ancillary system equipment, must be coordinated with the operations of all trade subcontractors so as to insure sufficient and timely performance of the Work. Once the permanent heating system is operating properly, the Contractor must remove all portions of the system for Temporary Heat not part of the permanent heating system.
3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances:
- a. The City may establish an Allowance in the Contract for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. If established, the City will include an amount for such Allowance on the Bid Form, and the Contractor must include such Allowance amount in its total Contract price. The Contractor will only be entitled to payment from this Allowance under the conditions and in accordance with the requirements set forth below. In the event this Allowance or any portion thereof remains unexpended at the conclusion of the Contract, such Allowance must remain the sole property of the City. Should the amount of the Allowance be insufficient to provide payment for the expenses specified below, the City will increase the amount of the Allowance.
 - b. The Allowance set forth herein may be utilized only under the conditions set forth below.
 1. In the event the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, and the Commissioner determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor must be responsible for the provision of Temporary Heat, as directed by the Commissioner. The City must pay such Contractor for all costs for labor, material, and equipment necessary and required for the same. Payment must be made in accordance with Article 26 of the Contract, except that the cost of fuel must be as set forth in Paragraph (c) below.
 2. In the event the Commissioner determines that there is a need for maintenance of the permanent heating system by the Contractor after Final Acceptance by the Commissioner of the Work, and that the need for such maintenance is not the fault of the Contractor, the Contractor must provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City will pay the Contractor for the cost of direct labor and fuel necessary and required in connection with such maintenance, excluding the cost of any foremen or other supervision. Payment must be made in accordance with Article 26 of the Contract, except that the cost of fuel must be as set forth in Paragraph (c) below.



- c. Payment for Fuel Costs: Payment from the Allowance set forth herein for the cost of fuel necessary and required to operate the system for the provision of Temporary Heat, or to maintain the permanent heating system under the conditions set forth in Paragraph b above, must be limited to the direct cost of such fuel. The Contractor will not be entitled to any overhead and/or profit for such fuel costs. In order to receive payment for such fuel costs, the Contractor must present original invoices for the same. DDC reserves the right to furnish the required fuel.

I. RELATED ELECTRICAL WORK:

- 1. The Contractor must be responsible for providing the items set forth below and must include all expenses in connection with such items in its total Contract price. The Contractor must provide such items promptly when required and must in all respects coordinate its Work with the Work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.
 - a. The Contractor must provide all labor, materials, equipment and power necessary and required to furnish and maintain any temporary or permanent electrical connections to all equipment specified to be connected as part of the work of the Contractor's Contract.
 - b. The Contractor must supply and pay for all power necessary and required for the operation of the system for the provision of Temporary Heat and/or the permanent heating system used for Temporary Heat. Such power must be provided by the Contractor for the duration the Contractor is required to provide Temporary Heat, as set forth in sub-section 3.5 D herein.
- 2. In providing the items set forth in Paragraph 1 above, the Contractor is advised that labor may be required seven (7) days a week and/or during non-regular working hours for the period of time required by seasonal weather conditions.

J. RELATED PLUMBING WORK:

- 1. The Contractor must be responsible for providing all labor, materials, and equipment necessary and required to furnish and maintain all temporary or permanent connections to all equipment or plumbing outlets specified to be provided as part of the Work of this Contract. The Contractor must include all expenses in connection with such items of Work in its total Contract price. The Contractor must provide such items of Work promptly when required and must in all respects coordinate its Work with the Work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.
- 2. In the event portions of the permanent plumbing equipment furnished by the Contractor as part of the Work of this Contract are used for the provision of Temporary Heat either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor will be responsible to provide such plumbing equipment to the City in near-perfect condition and must make any repairs required, other than for ordinary wear and tear on the equipment, at the Contractor's expense. The starting date for warranty and/or guarantee period for such plumbing equipment must be the date of Substantial Completion by the City.
- 3. For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor must promptly perform all required filings and coordination with the utility companies in order to expedite the installation, testing, and approval of the gas service and associated meter(s).

3.6 STORM WATER CONTROL, DEWATERING FACILITIES AND DRAINS:

A. PUMPING:

- 1. Comply with requirements of authorities having jurisdiction. Maintain Project Site, excavations, and construction free of water. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rainfall.



2. Contractor must furnish and install all necessary automatically operated pumps of adequate capacity with all required piping to run-off agencies, so as to maintain the excavation, cellar floor, pits and exterior depressions and excavations free from accumulated water during the entire period of construction and up to the date of Final Acceptance of Work of the Contract.
3. All pumps must be maintained at all times in proper working order.
4. Dispose of rainwater in a lawful manner that will not result in flooding the Project or adjoining properties nor endanger permanent Work or temporary facilities.
5. Remove snow and ice as required to minimize accumulations.

3.7 TEMPORARY FIELD OFFICE FOR CONTRACTOR:

- A. The Contractor must establish a temporary field office for its own use at the Site during the period of construction, at which readily available copies of all Contract Documents must be kept.
- B. The field office must be located where it will not interfere with the progress of any part of the Work or with visibility of traffic control devices.
- C. CONTRACTOR'S REPRESENTATIVE: There must be a responsible and competent representative of the Contractor in charge of the office who is duly authorized to receive orders and directions and to put them into effect.
- D. Arrangements must be made by the Contractor whereby its representative may be readily available by telephone.
- E. All temporary structures must be of substantial construction and neat appearance, and must be painted a uniform gray unless otherwise directed by the Commissioner.
- F. CONTRACTOR'S SIGN: The Contractor must post and keep posted on the outside of its field office, office, exterior fence, or wall at Site of Work, a legible sign giving the full name of the company, address of the company and telephone number(s) of responsible representative(s) of the firm who can be reached in the event of an emergency at any time.
- G. ADVERTISING PRIVILEGES: The City reserves the right to all advertising privileges. The Contractor must not cause any signs of any kind to be displayed at the Site unless specifically required herein or authorized by the Commissioner.

3.8 DDC FIELD OFFICE:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 A

- A. OFFICE SPACE IN EXISTING BUILDING:
 1. The Resident Engineer will arrange for office space for sole use in the building where Work is in progress. The Contractor must provide and install a lockset for the door to secure the equipment in the room. The Contractor must provide two (2) keys to the Resident Engineer. After completion of the Project the Contractor must replace the original lockset on the door and ensure its proper operation.
 2. In addition to equipment specified in sub-section 3.8 D, the Contractor must provide, for exclusive use of the DDC Field Office, the following:
 - a. Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two metal (2) lockers, single units, 15" x 18" x 78" overall including 6" legs. Lockers to have flat key locks with two (2) keys each, General Steel products or approved equal. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks, approximately 52"H x 28 ½"D x 18"W.



- b. One (1) 9000 B.T.U air conditioner or as directed by Commissioner. Wiring for the air conditioner must be minimum No. 12 AWG fed from individual circuits in the fuse box.
 - c. One (1) folding conference table, 96" x 30" and ten (10) folding chairs.
 - d. Two (2) metal wastebaskets.
 - e. One (1) fire extinguisher, one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - f. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Project as required.
3. The Contractor must provide one (1) telephone, where directed and must pay all costs for telephone service for calls within the New York City limits for the duration of the Project.
 4. All furniture and equipment, except computer equipment specified in sub-section 3.8 D.3, must remain the property of the Contractor.
 5. Computer workstation quantities must be provided as specified in sub-section 3.8 B 3-a for DDC Managed Projects, or sub-section 3.8 B 3-b for CM Managed Projects.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 B

B. DDC FIELD OFFICE TRAILER:

1. **GENERAL:** The Contractor must, for the time frame specified herein, provide and maintain at its own cost and expense a DDC Construction Field Office and all related items as specified herein [hereinafter collectively referred to as the "DDC Field Office"] for the exclusive use of the Resident Engineer. The DDC Field Office must be located at the Project Site and must be solely dedicated to the Project. Provision of the DDC Field Office must commence within thirty (30) Days from Notice to Proceed (NTP) and must continue through forty-five (45) Days after Substantial Completion of the required construction at the Project Site. The Contractor must remove the DDC Field Office forty-five (45) Days after Substantial Completion of the required construction, or as otherwise directed in writing by the Commissioner.
2. **TRAILER:** The Contractor must provide at its own cost and expense a mobile office trailer for use as the DDC Field Office. The Contractor must install and connect all utility services to the trailer within thirty (30) Days from NTP. The trailer must have equipment in compliance with the minimum requirements hereinafter specified. Any permits and fees required for the installation and use of said trailer must be borne by the Contractor. The trailer including furniture and equipment therein, except computer equipment specified in sub-section 3.8D.3 herein, must remain the property of the Contractor.
3. Trailer must be an office-type trailer of the size specified herein, with exterior stairs at entrance. Trailer construction must be minimum 2 x 4 wall construction fully insulated with paneled interior walls, pre-finished gypsum board ceilings and vinyl tile floors.



**REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8.B.3a or
SUB-SECTION 3.8.B.3b.**

- a. DDC Managed Project Trailer: DDC Field Office Trailer Size, Layout and Computer Workstation:
 - 1) Overall length: 32 Feet
Overall width: 10 Feet
 - 2) Interior Layout:
Provide one (1) general office/conference room area and one (1) private office at one end of the trailer. Provide equipment and amenities as specified in sub-section 3.8.B herein.
 - 3) Computer Workstation: Provide one (1) complete computer workstation and one (1) tablet, as specified in sub-section 3.8.D herein, in the private office area as directed by the Resident Engineer.

- b. CM Managed Project Trailer: DDC Field Office Trailer Size, Layout and Computer Workstation:
 - 1) Overall length: 50 Feet
Overall width: 10 Feet
 - 2) Interior Layout:

Provide one (1) large general office/conference room in the center of the trailer and two (2) private offices, one (1) each at either end of the trailer. Provide equipment and amenities as specified in sub-section 3.8.B herein.
 - 3) Computer Workstation:

Provide three (3) complete computer workstations and two (2) tablets as specified in sub-section 3.8.D herein. Provide one (1) each complete computer workstation in each private office and one (1) complete computer workstation at the secretarial position as directed by the Resident Engineer.

- 4. The exterior of the trailer must be lettered with black block lettering of the following heights with white borders:

CITY OF NEW YORK	2-1/2"
DEPARTMENT OF DESIGN AND CONSTRUCTION	3-3/4"
DIVISION OF PUBLIC BUILDINGS	3-1/2"
DDC FIELD OFFICE	2-1/2"

NOTE: In lieu of painting letters on the trailer, the Contractor may substitute a sign constructed of a good quality weatherproof material with the same type and size of lettering above.

- 5. All windows and doors must have aluminum insect screens. Provide wire mesh protective guards at all windows.

- 6. The interior must be divided by partitions into general and private office areas as specified herein. Provide a washroom located adjacent to the private office and a built-in wardrobe closet opposite the washroom. Provide a built-in desk in the private office(s) with fixed overhead shelf and clearance below for two (2) file cabinets.

- 7. Provide a built-in drafting or reference table, located in the general office/conference room, at least sixty (60) inches long by thirty-six (36) inches wide with cabinet below and wall type plan rack at least forty-two (42) inches wide.



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8. The washroom must be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies and a toilet roll tissue holder. Plumbing and fixtures must be approved house type, with each appliance trapped and vented and a single discharge connection. Five (5) gallon capacity automatic electric heater for domestic hot water must be furnished.
9. HVAC: The trailer must be equipped with central heating and cooling adequate to maintain a temperature of seventy-two (72) degrees during the heating season and seventy-five (75) degrees during the cooling season when the outside temperature is five (5) degrees F. winter and eighty-nine (89) degrees F. summer.
10. Lighting must be provided via ceiling mounted fluorescent lighting fixtures to a minimum level of fifty (50) foot candles in the open and private office(s) along with sufficient lighting in the washroom. Broken and burned out lamps must be replaced by the Contractor. A minimum of four (4) duplex convenience outlets must be provided in the open office and two (2) each in the private office(s). These outlets must be in addition to special outlet requirements for computer stations, copiers, HVAC unit, etc.
11. Electrical service switch and panel must be adequately sized for the entire trailer load. Provide dedicated circuits for HVAC units, hot water heater, copiers and other equipment as required. All wiring and installation must conform to the New York City Electrical Code.
12. The following movable equipment must be furnished:
 - a. Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks and two (2) full ball bearing two (2) drawer vertical legal filing cabinets in each private office located below built-in desk.
 - b. One (1) folding conference table, 96" x 30" and ten (10) folding chairs.
 - c. Three (3) metal wastebaskets.
 - d. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - e. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Contract as required.
13. TRAILER TEMPORARY SERVICE: Plumbing and electrical Work required for the trailer will be furnished and maintained as below.
 - a. PLUMBING WORK: The Contractor must provide temporary water and drainage service connections to the DDC Field Office trailer for a complete installation. Provide all necessary soil, waste, vent and drainage piping.

Contractor to frost-proof all water pipes to prevent freezing.

 - 1) REPAIRS, MAINTENANCE: The Contractor must provide repairs for the duration of the Project until the trailer is removed from the Site.
 - 2) DISPOSITION OF PLUMBING WORK: At the expiration of the time limit set forth in sub-section 3.8 B 1 herein, the temporary water and drainage connections and piping to the DDC Field Office trailer must be removed by the Contractor and must be plugged at the mains. All piping must become the property of the Contractor for plumbing Work and must be removed from the Site, all as directed. All repair Work due to these removals must be the responsibility of the Contractor.
 - b. ELECTRICAL WORK:
 - 1) The Contractor must furnish, install and maintain a temporary electric feeder to the



- DDC Field Office trailer immediately after it is placed at the job Site.
- 2) The temporary electrical feeder and service switch/fuse must be adequately sized based on the trailer load and installed per the New York City Electrical Code and complying with utility requirements.
 - 3) Make all arrangements and pay all costs to provide electric service.
 - 4) The Contractor must pay all costs for current consumed and for maintenance of the system in operating condition, including the furnishing of the necessary bulb replacements lamps, etc., for the duration of the Project and for a period of forty-five (45) Days after the date of Substantial Completion.
 - 5) Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., must be removed and disposed of as directed.
 - 6) All repair Work due to these removals must be the responsibility of the Contractor.
- c. MAINTENANCE:
- 1) The Contractor must provide and pay all costs for regular weekly janitor service and furnish toilet paper, sanitary seat covers, cloth towels and soap and maintain the DDC Field Office in first-class condition, including all repairs, until the trailer is removed from the Site.
 - 2) Supplies: The Contractor must be responsible for providing (1) all office supplies, including without limitation, pens, pencils, stationery, filtered drinking water and sanitary supplies, and (2) all supplies in connection with required computers and printers, including without limitation, an adequate supply of blank CD's/DVD's, storage boxes for blank CDs/DVDs, and paper and toner cartridges for the printer.
 - 3) Risk of Loss: The entire risk of loss with respect to the DDC Field Office and equipment must remain solely and completely with the Contractor. The Contractor must be responsible for the cost of any insurance coverage determined by the Contractor to be necessary for the field office.
 - 4) At forty-five (45) Days after the date of Substantial Completion, or sooner as directed by the Commissioner, the Contractor must have all services disconnected and capped to the satisfaction of the Commissioner. All repair Work due to these removals must be the responsibility of the Contractor.
- d. TELEPHONE SERVICE: The Contractor must provide and pay all costs for the following telephone services for the DDC Field Office trailer:
- 1) Separate telephone lines for one (1) desk phone in each private office.
 - 2) One (1) wall phone (with six (6) foot extension cord) at plan table.
 - 3) Separate telephone lines for the fax machine and internet access in each private office. Telephone service must include voice mail. All electronic voicemail messages must be automatically forwarded as email attachments, to allow for the voicemails to be played remotely.
 - 4) A remote bell located on outside of trailer
 - 5) The telephone service must continue until the trailer is removed from the Site.
- e. PERMITS: The Contractor must make the necessary arrangements and obtain all permits and pay all fees required for this Work.



- C. RENTED SPACE: The Contractor has the option of providing, at its cost and expense, rented office or store space in lieu of trailer. Said space must be in the immediate area of the Project and have adequate plumbing, heating and electrical facilities. Space chosen by the Contractor for the DDC Field Office must be approved by the Commissioner before the area is rented. All insurance, maintenance and equipment, including computer workstations specified in sub-section 3.8 D in quantities required as specified in sub-section 3.8 B 3 for the DDC Field Office trailer, must also apply to rented spaces.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 D

- D. ADDITIONAL EQUIPMENT FOR THE DDC FIELD OFFICE:
1. Photocopying Machine: Stand-alone, heavy duty, electric, dry-process color photocopying type with color scan and send capability via email, a minimum production rate of seventy (70) pages per minute and an adequate supply of copy paper, toner, etc. The machine must be capable of duplex copying paper sizes of 8-1/2 x 11 inches, 8-1/2 x 14 inches and 11 x 17 inches, and have separate trays for each paper size. It must have a document feeder, collator, stapler, and the capability to reduce/enlarge copies between each paper size. The supply of each size copy paper, toner, etc. must be replenished and the machines must be maintained for the duration of the Contract by the Contractor as required by the Resident Engineer. Make and model can be Minolta, Canon, IBM, Epson, or an approved equivalent, and must be networked to the office computers for printing capability. Copier must remain at job Site until the DDC Field office trailer is removed from the Site.
 2. The Contractor must furnish a fax machine and a telephone answering machine at commencement of the Project for the exclusive use of the DDC Field Office. All materials must be new, sealed in manufacturer's original packaging and must have manufacturers' warranties. All items must remain the property of the City of New York at the completion of the Project.
 3. COMPUTER WORKSTATION: The Contractor must provide one (1) complete computer workstation, in quantities specified in sub-section 3.8.B.3, as specified herein:
 - a. Hardware/Software Specification:
 - 1) Computer Equipment: Computers must be provided for all Contracts that have a total Consecutive Calendar Days (CCD) for construction duration, as set forth in Schedule "A", of 180 CCD's or greater. Contracts of lesser duration must not require computers.
 - 2) Computers furnished by the Contractor for use by City Personnel for the duration of the Contract must be in accordance with the Specific Requirements contained herein, must remain the property of the City of New York at the completion of the Project, and must meet the following minimum requirements:
 - 3) Personal Computers – Personal Computers must meet the requirements of the US General Services Administration (GSA) Government-Wide Strategic Solutions (GSS) Standard Laptop, Desktop, and Tablet Specifications, V7. (Available online at <https://hallways.cap.gsa.gov/>)
 - (a) Computer type for Personal Computers to be "Desktop Small Form Factor."
Computer type for tablet to be "Tablet"
 - (b) The following components listed as optional in the GSA specification must be provided with each personal computer: monitor, speakers, optical drive, smart card reader, webcam, and headset.
 - (c) The following additional software must be provided with licenses for each computer:
 1. Adobe Acrobat Pro DC or Bluebeam Revu
 2. Microsoft Office Professional
 3. Autodesk AutoCAD LT
 4. Anti-virus software



- 5. Microsoft Visio (only one license required per field office)

- 4) DDC Field Office Specs: DDC Field Offices requiring computers must be provided with the following:
 - a) One (1) broad-band internet service account. See table below for minimum required upload and download speeds. Telephone service should be bundled together with Internet connectivity. Because of throughput requirements Verizon FIOS is the preferred connectivity provider where available.

Office Personnel #	Download Speeds (<i>Minimum</i>)	Upload Speeds (<i>Minimum</i>)
1 – 5	10 Mbps	15 Mbps
6 – 10	20 Mbps	15 Mbps
11 – 15	25 Mbps	15 Mbps
16 – 20	50 Mbps	15 Mbps

This account will be active for the life of the Project. The e-mail name for the account must be the DDC Field Office/Project ID (preferably Gmail or Outlook e.g. ABC1234@gmail.com).

- b) One (1) 600 DPI HP Color Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper (Legal Size) (Not required if photocopying machine prints in color).
 - c) All necessary cabling for equipment specified herein
 - d) Storage Boxes for Blank CD's
 - e) Printer Table
 - f) UPS/Surge Suppressor combo
 - g) Ten (10) USB Thumb (or Flash) Drives – sixteen (16) GB each
- 5) All computers required for use in the DDC Field Office must be delivered, installed, and setup in the Field Office by the Contractor.
 - 6) All Computer Hardware must come with a three (3) year warranty for on-site repair or replacement. Additionally, and notwithstanding any terms of the warranty to the contrary, the Contractor is responsible for rectifying all computer problems or equipment failures within one (1) business day.
 - 7) An adequate supply of blank CDs/DVDs, and paper and toner cartridges for the printer must be provided by the Contractor and must be replenished by the Contractor as required by the Resident Engineer.
 - 8) It is the Contractor's responsibility to ensure that electrical service and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty-four (24) hours each Day.
 - 9) Broadband connectivity is preferred at each field office location. Please take into consideration that an extra phone line dedicated to the modem must be ordered as part of the Contract unless Internet broadband connectivity, via Cable or DSL, is available at the planned field office location. Any questions regarding this policy should be directed



to the Assistant Commissioner of ITS at 718-391-1761.

E. HEAD PROTECTION (HARD HATS):

1. The Contractor must provide a minimum of ten (10) standard protective helmets for the exclusive use of DDC personnel and their visitors. Helmets must be turned over to the Resident Engineer and kept in the DDC Field Office.
2. Upon completion of the Project, the helmets must become the property of the Contractor.

3.9 MATERIAL SHEDS:

- A. Material sheds used by the Contractor for the storage of its materials must be kept at locations which will not interfere at any time with the progress of any part of the Work or with visibility of traffic control devices.
- B. The Contractor must store combustible materials apart from the facility.

3.10 TEMPORARY ENCLOSURES:

- A. The Contractor must provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
- B. Where heating or cooling is needed and Permanent Enclosure is not complete, the Contractor must insulate temporary enclosures.

3.11 TEMPORARY PARTITIONS:

- A. The Contractor must provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied tenant areas from fumes and noise, including, but without limitation:
 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
 2. Construct dustproof partitions with 2 layers of 3-mil (0.07-mm) polyethylene sheet on each side. Cover floor with two (2) layers of 3-mil (0.07-mm) polyethylene sheet, extending sheets eighteen (18) inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than forty-eight (48) inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
 3. Insulate partitions to provide noise protection to occupied areas.
 4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 5. Protect air-handling equipment.
 6. Weather strip openings.
 7. Provide walk-off mats at each entrance through temporary partition.

3.12 TEMPORARY FIRE PROTECTION:

- A. The Contractor must install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with National Fire Protection Association (NFPA) Standard 241.
- B. Smoking in all areas is prohibited.



- C. The Contractor must supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
- D. The Contractor must develop and supervise an overall fire-prevention and protection program for personnel at Project Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- E. The Contractor must provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.13

3.13 WORK FENCE ENCLOSURE:

- A. The Contractor must furnish, erect and maintain a wood construction or chain-link fence to the extent shown on the Contract Drawings or required by the Work enclosing the entire Project on all sides. All materials used must be new. Any permit required for the installation and use of said fence and costs must be borne by the Contractor.
- B. WOOD FENCE must be seven (7) feet high with framing construction of yellow pine, using 4" x 4" approved preservative-treated posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which must be secured minimum 1/2 inch thick exterior grade plywood. Posts must be firmly fixed in the ground at least 30" and thoroughly braced. Top edge of fence must be trimmed with a rabbeted edge mould. Provide on the street traffic sides of fence, observation openings as directed.
 - 1. GATES: The Contractor must provide an adequate number of double gates, complete with hardware, located as approved by the Resident Engineer. Double gates must have a total clear opening of 14'-0" with two (2) 7'-0" hinged swinging sections. Hanging posts must be 6" x 6" and must extend high enough to receive and be provided with tension or sag rods for the swinging sections.
 - 2. PAINTING: The fence and gates must be entirely painted on the street and public sides with one (1) coat of exterior primer and one (1) top coat of exterior grade acrylic-latex emulsion paint. Black stenciled signs reading "POST NO BILLS" must be painted on fence with three (3) inch high letters on twenty-five (25) foot spacing for the entire length of fence on street traffic sides. Signs must be stenciled five (5) feet above the sidewalk.
- C. CHAIN-LINK FENCING must be minimum two (2) inch thick, galvanized steel, chain-link fabric fencing; eight (8) feet high with galvanized steel pipe posts; minimum 2-3/8-inch Outside Diameter (OD) line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Fence must be accurately aligned and plumb, adequately braced and complete with gates, locks and hardware as required. Under no condition must fencing be attached or anchored to existing construction or trees.
- D. ADDITIONAL REQUIREMENTS:
 - 1. It must be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
 - 2. Should the fencing be required to be relocated during the course of the Contract, it must be done by the Contractor at no additional cost to the City.
 - 3. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad must be provided for protection of sidewalks and curbs.
 - 4. Where required, make provision for fire hydrants, lampposts, etc.
- E. REMOVAL: When directed by the Resident Engineer, the fence must be removed.



3.14 RODENT AND INSECT CONTROL:

- A. DESCRIPTION: The Contractor must provide all labor, materials, plant and equipment, and incidentals required to survey and monitor rodent activity and to control any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the Project area. Special attention should be paid to the following conditions or areas:
 - 1. Wet areas within the Project area, including all temporary structures.
 - 2. All exterior and interior temporary toilet structures within the Project area.
 - 3. All Field Offices and shanties within the Project area of all subcontractors and DDC.
 - 4. Wherever there is evidence of food waste and/or discarded food or drink containers, in quantity, that would cause breeding of rodents or the insects herein specified.
 - 5. Any other portion of the Site requiring such special attention.
- B. MATERIALS:
 - 1. All materials must be approved by the New York State Department of Environmental Conservation (DEC) and comply with the New York City Health Code, OSHA and the laws, ordinances and regulations of state and federal agencies pertaining to such chemical and/or materials.
- C. PERSONNEL:
 - 1. All pest control personnel must be supervised by an exterminator licensed in categories 7A and 8.
- D. METHODS:
 - 1. Application and dosage of all materials must be done in strict compliance with the manufacturer's recommendations.
 - 2. Any unsanitary conditions, such as uncollected garbage or debris, resulting from all Contractor's activities, which will provide food and shelter to the resident rodent population must be corrected by the Contractor immediately after notification of such condition by the Resident Engineer.
- E. RODENT CONTROL WORK:
 - 1. In wetlands, woodlands, and areas adjacent to a stream, special precautions must be taken to protect water quality and to ensure the safety of other wildlife. To prevent poisoned bait from entering streams, no poisoned bait must be used in areas within seventy-five (75) feet of all stream banks. Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.
 - 2. In areas outside the seventy-five (75) foot zone of protection adjacent to streams, and in areas outside wetlands and woodlands, tamper proof bait stations with poisoned bait must be placed during the period of construction and any consumed or decomposed bait must be replenished as directed.
 - 3. At least one (1) month prior to initiation of the construction Work, and periodically thereafter, live traps and/or rodenticide bait in tamper proof bait stations, as directed above, must be placed at locations that do not allow access to pets, human beings, children and other non-target species, particularly wildlife (for example-birds) in the Project area.
 - 4. The Contractor must be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper-proof bait stations. The Contractor must also be responsible for posting and maintaining signs announcing the baiting of each particular location.
 - 5. The Contractor must be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the Project area.



6. It is anticipated that public complaints will be addressed to the Commissioner. The Contractor, where directed by the Commissioner, must take appropriate actions, like baiting, trapping, proofing, etc., to remedy the source of complaint within the next six (6) hours of normal working time which is defined herein for the purposes of this section as 7 A.M. to 6 P.M. on Mondays through Saturdays.
7. Emergency service during the regular workday hours (Monday through Friday) must be rendered within twenty-four (24) hours, if requested by the Commissioner, at no additional cost to the City.

F. EDUCATION & NOTICES:

1. The Contractor must post notices on all Construction Bulletin Boards advising workers, employees, and residents to call the DDC Field Office to report any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the Project area. The Contractor must provide and distribute literature pertaining to Integrated Pest Management (IPM) techniques of rodent control to affected businesses and superintendents of nearby residential buildings to ensure their participation in maintaining their establishments free of unsanitary conditions, harborage removal and rodent proofing.
2. Prior to application of any chemicals, the Contractor must furnish to the Commissioner copies or sample labels for each pesticide, antidote information, and Material Data Safety Sheets (MSDS) for each chemical used.

G. RECORDS

1. The Contractor must keep a record of all rodent and waterbug infestation surveys conducted and make available, upon request, to the Commissioner. The findings of each survey must include, but not be limited to, recommended IPM techniques, like baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.
2. The Contractor must maintain records of all locations baited along with the type and quantity of rodenticide and insecticide bait used.

3.15 PLANT PEST CONTROL REQUIREMENTS AND TREE PROTECTION REQUIREMENTS:

- A. Plant Pest Control Requirements: The Contractor and its subcontractors, including the Certified Arborist described below, must comply with all federal and New York State laws and regulations concerning Asian Longhorned Beetle (ALB) management, including protocols for ALB eradication and containment promulgated by the New York State Department of Agriculture and Markets (NYSDAM). The Contractor is referred to: (1) Part 139 of Title 1 NYCRR, Agriculture and Markets Law, Sections 18, 164 and 167, as amended, and (2) State Administrative Procedure Act, Section 202, as amended.
1. All tree Work performed within the quarantine areas must be performed by NYSDAM certified entities. Transportation of all host material, living, dead, cut or fallen, inclusive of nursery stock, logs, green lumber, stumps, roots, branches and debris of a half inch or more in diameter from the quarantine areas is prohibited unless the Contractor or its subcontractor performing tree Work has entered into a compliance agreement with NYSDAM. The terms of said compliance agreement must be strictly complied with. Any host material so removed must be delivered to a facility approved by NYSDAM. For the purpose of this Contract, host material must be ALL species of trees.
 2. Any host material that is infested with the ALB must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.
 3. Prior to commencement of tree Work, the Contractor must submit to the Commissioner a copy of a valid ALB compliance agreement entered into with NYSDAM and the Contractor or its subcontractor performing tree Work. If any host material is transported from the quarantine area the Contractor must immediately provide the Commissioner with a copy of the New York State 'Statement of Origin and Disposition' and a copy of the receipt issued by the NYSDAM approved facility to which the host materials are transported.



4. Quarantine areas, for the purpose of this Contract, must be defined as all five boroughs of the City of New York. In addition, prior to the start of any tree Work, the Contractor must contact the NYC Department of Parks & Recreation's (DPR) Director of Landscape Management at (718) 699-6724, to determine the limits of any additional quarantine areas that may be in effect at the time when tree Work is to be performed. The quarantine area may be expanded by federal and state authorities at any time and the Contractor is required to abide by any revisions to the quarantine legislation while working on this Contract. For further information please contact: NYSDAM (631) 288-1751.
- B. Tree Protection Requirements: The Contractor must retain a Certified Arborist, as defined by DPR regulations, to provide the services described below.
1. Surveys and Reports: The Certified Arborist must, at the times indicated below, conduct a survey and prepare a plant material assessment report which includes: (1) identification, by species and pertinent measurements, of all plant material located on the Project Site, or in proximity to the Project Site, as described below, including all trees, significant shrubs and/or planting masses; (2) identification and plan for the containment of plant pests and pathogens, including the ALB, as described in paragraph A above; and (3) evaluation of the general health and condition of any infected plant material.
 2. Frequency of Reports: The Certified Arborist must conduct a survey and provide a plant material assessment report at two (2) points in time: (1) prior to the commencement of construction Work; and (2) at the time of Substantial Completion. In addition, for projects exceeding twenty-four (24) months in duration, the Certified Arborist must conduct a survey and prepare a report at the midpoint of construction. Copies of each plant material assessment report must be submitted to the Resident Engineer within two (2) weeks of the survey.
 3. Proximity to Project Site: Off-site trees, significant shrubs and/or planting masses must be considered to be located in proximity to the Project Site under the circumstances described below.
 - a. The tree trunk, significant shrub, or primary cluster of stems in a planting mass is within fifty (50) feet of the project's Contract Limit Lines (CLLs) or Property Lines (PLs).
 - b. Any part of the tree or shrub stands within fifty (50) feet of: (a) a path for Site access for vehicles and/or construction equipment; or (b) scaffolding to be erected for construction activity, including façade remediation projects.
 - c. The Certified Arborist determines that the critical root zone (CRZ) of an off-site tree, significant shrub, or primary cluster of stems in a planting mass extends into the Project Site, whether or not that plant material is located within the fifty (50) foot inclusionary perimeter as outlined above.
 4. Tree Protection Plan: The Certified Arborist must prepare, and the Contractor must implement, a Tree Protection Plan for all trees that may be affected by any construction Work, excavation or demolition activities, including without limitation: (1) on-site trees, (2) street trees, as defined below, (3) trees under DPR jurisdiction as determined by the NYC Department of Transportation, and (4) all trees that are located in proximity to the Project Site, as defined above. The Tree Protection Plan must comply with the DPR rules, regulations and specifications. The Contractor is referred to Chapter 5 of Title 56 of the Official Compilation of the Rules of the City of New York. Copies of the Tree Protection Plan must be submitted to the Resident Engineer prior to the commencement of construction. Implementation of the Tree Protection Plan for street trees and trees under DPR jurisdiction must be in addition to any tree protection requirements specified or required for the Project Site. For the purpose of this article, a "street tree" means the following: (1) a tree that stands in a sidewalk, whether paved or unpaved, between the curb lines or lateral lines of a roadway and the adjacent property lines of the Project Site, or (2) a tree that stands in a sidewalk and is located within fifty (50) feet of the intersection of the Project's Site's PL with the street frontage property line.



- C. No Separate Payment: No separate payment must be made for compliance with Plant Pest Control Requirements or Tree Protection Requirements. The cost of compliance with Plant Pest Control Requirements and Tree Protection Requirements must be deemed included in the Contractor’s bid for the Project.

3.16 PROJECT IDENTIFICATION SIGNAGE:

- A. The Contractor must provide, install and maintain Project identification and other signs where indicated to inform public and individuals seeking entrance to the Project.
- B. In order to properly convey notice to persons entering upon a City construction Site, the Contractor must furnish and install a sign at the entrance (gates) as follows:

**NO TRESPASSING
AUTHORIZED PERSONNEL ONLY**

- C. If no construction fence exists at the Site, this notice must be conveyed by incorporating the above language into safety materials (barriers, tape, and signs).
- D. Provide temporary, directional signs for construction personnel and visitors.
- E. Maintain and touch up signs so that they are legible at all times.

3.17 PROJECT CONSTRUCTION SIGN AND RENDERING:

- A. PROJECT SIGN:
 1. Responsibility: The Contractor must produce and install one (1) Project sign which must be posted and maintained upon the Project Site at a place and in a position directed by the Commissioner. The Contractor must protect the sign from damage during the continuance of Work under the Contract and must do all patching of lettering, painting and bracing thereof necessary to maintain the sign in first class condition and in proper position. Prior to fabrication, the Contractor must submit an 8-1/2” x 11” color match print proof from the sign manufacturer of the completed sign for approval by the Commissioner.
 2. Sign Quality: The Contractor must provide all materials required for the production of the sign as specified herein. Workmanship must be of the best quality, free from defects and must be produced in a timely manner.
 3. Schedule: Upon Project mobilization, the Contractor must commence production and installation of the sign.
 4. Removal: At the completion of all Work under the Contract, the Contractor must remove and dispose of the Project sign away from the Site.
 5. Sign construction:
 - a. Frame: The frame must be from quality dressed 2”x2” pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign must have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame must be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.
 - b. Edging: U-shaped, twenty-two (22) gauge aluminum edging, with a white enameled finish to match sign background, must run around entire edging of sign panel and frame. Corners must be mitered for a tight fit. Channel dimensions must be 1” inch (overlap to sign panel face) x 1



3/4" (or as required across frame depth) x 1" (back overlap).

- c. Sign Panel: 4' x 8' panel must be constructed in one (1) piece of fourteen (14) gauge (.0785") 6061-T6 aluminum. This panel must be pre-finished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.
- d. Fastening: Fasten sign panel to wood frame using cadmium plated no. 8 sheet metal screws at 1/2" below edge of panel and 8" on center. The U-shaped aluminum channel must be applied over the wood frame edge and fastened with cadmium plated no. 8 sheet metal screws at 12" on center around the entire perimeter.

6. Sign Graphics:

- a. A digital file of the Project sign will be provided to the Contractor by the Commissioner's representative for printing. The Commissioner's representative must insert the Project name and names and titles of personnel (three (3) or more) and any other required information associated with the Project. All signs may include a second panel for a Project rendering as described in sub-section 3.17.B herein.
- b. The digital file must be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The 3M High Performance Vinyl or equivalent must be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking. The sign manufacturer is required to maintain all specified Pantone Matching System (PMS) type and other composition elements represented in the digital file of the Project sign.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.17 B

B. PROJECT RENDERING:

- 1. Responsibility: In addition to the Project sign, the Contractor must furnish and install one (1) sign showing a rendering of the Project. A digital file of the Project rendering will be provided to the Contractor by the Commissioner's representative. From an approved image file provided by DDC, the Project rendering is to be sized, printed, and mounted in an identical manner as described in sub-section 3.17.A above for the Project sign. A color match print proof from the sign manufacturer of the rendering sign printed from the supplied file is to be submitted to DDC for approval before fabrication. The rendering sign is to be posted at the same height as the Project sign. Where possible, the rendering sign must be mounted with a perfect match of the short sides of the rectangle so that the rendering sign and the Project sign together will create one long rectangle.
- 2. Removal: At the completion of all Work under the Contract, the Contractor must remove and dispose of the Project rendering away from the Site.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.18

3.18 SECURITY GUARDS/FIRE GUARDS ON SITE:

A. SECURITY GUARDS (WATCHMEN):

- 1. The Contractor must provide a competent security guard service on the Site, beginning on the date on which the Contractor commences actual construction Work, or on such earlier date on which there is activity at the Site related to the Work, including without limitation, delivery of materials or construction set-up. The Contractor must continue to provide such security guard service until the date on which it completes all required Work at the Site, including all punch list Work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. Throughout the specified time period, there must be no less than one (1) security guard on duty every day, including Saturdays, Sunday and holidays, twenty-four (24) hours a day, except between the hours of 8:00 A.M. and 4:00 P.M. on any day which is a regular working day for a majority of the trade



subcontractors. This exception during the working day must not apply after the finishing painting of the plaster Work is commenced; thereafter, not less than one (1) security guard must be on duty continuously, twenty-four (24) hours a day.

2. Every security guard must be required to hold a "Certificate of Fitness" issued by FDNY. Every security guard must, during his/her tour of duty, perform the duties of fire guard in addition to his/her security obligations.
 3. Should the Commissioner find that any security guard is unsatisfactory, such guard must be replaced by the Contractor upon the written demand of the Commissioner.
 4. Each security guard furnished by the Contractor must be instructed by the Contractor to include in his/her duties the entire construction Site including the Field Office, temporary structures, and equipment, materials, etc.
 5. Should the Contractor or any other subcontractor consider the security requirements outlined above inadequate, the Contractor must provide such additional security as it thinks necessary, after obtaining the written consent of the Commissioner. The additional cost of such approved increased protection will be paid by the Contractor.
 6. Nothing contained in this sub-section must diminish in any way the responsibility of the Contractor and each subcontractor for its own Work, materials, tools, equipment, nor for any of the other risks and obligations outlined hereinbefore in this Article.
- B. **COSTS:** The Contractor must employ security guards/fire guards throughout the specified time period, except as otherwise modified by the detailed Specifications and as approved by the Commissioner, for the purpose of safeguarding and protecting the Site. All costs for security guards/fire guards must be borne by the Contractor.
- C. **RESPONSIBILITY:** The Contractor and its subcontractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

3.19 SAFETY:

- A. The Contractor, in compliance with requirements of Section 01 35 26, SAFETY REQUIREMENTS PROCEDURES, must provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any removal of these items, during the progress of the Work, must be replaced by the Contractor at no additional cost to the City.

END OF SECTION 01 50 00



**SECTION 01 54 11
TEMPORARY ELEVATORS AND HOISTS**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Temporary Use, Operation and Maintenance of Elevators during Construction
 - a. For new buildings up to and including fifteen (15) stories
 - b. For new buildings over fifteen (15) stories
 - c. For existing buildings
 - 2. Temporary Construction Hoists and Hoistways (For Material and Personnel)

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 42 00 REFERENCES
- C. Section 01 50 00 TEMPORARY FACILITIES AND CONTROLS
- D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING
- E. Section 01 77 00 CLOSE OUT PROCEDURES

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.1

3.1 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDINGS UP TO AND INCLUDING FIFTEEN (15) STORIES:

- A. **INSTALLATION:** The Contractor must install, complete, operate, and maintain in good working order, as indicated herein, one (1) selected main elevator for the transport of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. The Contractor must furnish, install, and maintain such elevator in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. **RESPONSIBILITY:** The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.
- C. **COSTS:** The Contractor must be responsible for all costs in connection with the temporary elevator, including without limitation:



1. Installing and operating the temporary elevator;
2. Maintaining the temporary elevator in clean and proper operating condition, including the cost of lubricants and/or parts for such maintenance;
3. Performing all Work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevator;
4. Replacing the temporary elevator or any equipment or parts utilized in connection therewith, if required, due to damage, destruction, or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below;
5. Performing all required electrical Work in connection with the temporary elevator;
6. Providing all electric power required to operate the temporary elevator;
7. Providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevator; and
8. Providing all labor for the operation and maintenance of the temporary elevator, including on an overtime basis if necessary.

The total Contract price must include all costs in connection with the temporary elevator, including without limitation, the costs specified herein.

- D. **COMMENCEMENT OF SERVICE:** The Contractor must begin to provide temporary elevator service using the selected main passenger elevator no later than eight (8) weeks (forty (40) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed. No later than three (3) weeks (fifteen (15) Days) after the machine room roof slab has been placed, or that portion of it surrounding the elevator shaft, the following Work must be completed:
1. The shaft must be completely enclosed by either a permanent or temporary enclosure meeting all building code requirements.
 2. The machine room must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided to enable the safe and practicable hoisting of the elevator machinery for installation.
 3. On all floors at the shaft way entrances to the elevator, the Contractor must install solid substantial frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.
 4. The Contractor must furnish and install solid, substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at the top of car and a substantial temporary door or gate on the front of the elevator entrance.
- E. **ELECTRICAL INSTALLATION:** The Contractor, no later than twenty (20) Days after the machine room roof slab or that portion of it surrounding the elevator has been placed, must furnish and install temporary or permanent power and light feeders as required for the elevator used for temporary service. Additionally, the Contractor must connect such feeders to the terminals on the starter panels or controllers in the machine room to the low voltage transformers and car light outlets in the center of the shaft way and for the car control and signal traveling cables. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.
- F. **REMOVAL:** As directed by the Commissioner and when elevators for permanent use have been installed and are in proper condition for service, the Contractor must remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as required under the Contract.



- G. **INSPECTION:** Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection deems it necessary, the Contractor must furnish and install new governor and compensating ropes, traveling cables, controller parts, etc. The car and counterweight safeties must be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.
- H. **REPLACEMENT:** The Contractor must furnish and install new equipment or parts for any equipment or parts of the temporary elevator installation that have been damaged, destroyed, or that indicate excessive wear or corrosion, except for the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheave spaces used for temporary operation of elevators must be thoroughly cleaned. Where lubricated rails are used they must be washed down. If roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes.
- I. **LIMITATIONS ON USE:** The temporary elevator must not be used during its operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.
- J. **LIQUIDATED DAMAGES:** The Contractor will be charged at the rate of one hundred dollars (\$100) per Day for each Day it fails to provide the temporary elevator service described in this section beginning with the forty-first (41st) Day after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2

3.2 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDING OVER FIFTEEN (15) STORIES:

- A. **INSTALLATION:** The Contractor must install, complete, operate, and maintain in good working order, as indicated herein, two (2) selected main elevators for the transport of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of work at the Project. The Contractor must furnish, install, and maintain such elevators in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation, and maintenance of the temporary elevators and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use. The two (2) elevators must not be operated simultaneously.
- B. **RESPONSIBILITY:** The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevators and all equipment and/or parts utilized in connection therewith.
- C. **COSTS:** The Contractor must be responsible for all costs in connection with the temporary elevators, including without limitation:
 - 1. Installing and operating the temporary elevators;



2. Maintaining the temporary elevators in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance;
3. Performing all Work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevators;
4. Replacing the temporary elevators or any equipment or parts utilized in connection therewith, if required due to damage, destruction, or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below;
5. Performing all required electrical Work in connection with the temporary elevators;
6. Providing all electric power required to operate the temporary elevators;
7. Providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevators; and
8. Providing all labor for the operation and maintenance of the temporary elevators, including on an overtime basis if necessary.

The total Contract price must include all costs in connection with the temporary elevators, including without limitation, the costs specified herein.

- D. **LOW RISE ELEVATOR:** The Contractor must begin to provide temporary elevator service using one (1) selected main passenger elevator no later than six (6) weeks (thirty (30) Days) after the twelfth (12th) floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. No later than one (1) week, (five (5) Days), after the twelfth (12th) floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped, the following Work must have been completed:
1. The shaft must be completely enclosed up to the twelfth (12th) floor by either the permanent or a temporary enclosure meeting the requirements of the law.
 2. A temporary machine room enclosure must be provided at the eleventh (11th) floor and must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. The Contractor must install on all floors up to and including the ninth (9th) floor at the shaft entrances to the elevator, solid substantial wood frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.
 4. The Contractor must furnish and install solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, except that the portion of the front at the elevator entrance must be provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION:** The Contractor must, no later than ten (10) Days after the twelfth (12th) floor slab or that portion of it surrounding the elevator has been poured and stripped, furnish and install temporary or permanent power and light feeders as required for the elevator used for temporary service. The Contractor must connect such feeders to the terminals on the starter panels or controllers in the temporary machine room to the low voltage transformers, car light outlets in the center of the shaftway, and for the car control and signal traveling cables. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.
- F. **HIGH RISE ELEVATOR:** The Contractor must begin to provide temporary elevator service to all floors using a selected main passenger elevator no later than eight (8) weeks (forty (40) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft has been placed. No later than three (3) weeks (fifteen (15) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft has been placed, the following Work must have been completed:
1. The shaft must be completely enclosed by either the permanent or temporary enclosure, meeting the



- requirements of the law.
2. The machine room must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided to enable the safe and practicable hoisting of the elevator machinery for installation.
 3. The Contractor must install on all floors at the shaft way entrances to the elevator solid substantial frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.
 4. The Contractor must furnish and install solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, except that the portion of the front at the elevator entrance must be provided with a substantial temporary door or gate.
- G. **ELECTRICAL INSTALLATION:** The Contractor must, not later than twenty (20) Days after the machine room slab or that portion of it surrounding the elevator shaft has been placed, furnish and install temporary or permanent power and light feeders as required for the high-rise elevator to be used for temporary service. The Contractor must connect such feeders to the terminals on the motor-generator starter panels, or controllers in the machine room, to the signal circuits low voltage transformers for the annunciators and car light outlets in the center of shaft way. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.
- H. When the high-rise elevator is completed and ready for temporary operation, the low-rise temporary elevator must be shut down.
- I. **REMOVAL:** When directed by the Commissioner and one (1) or more elevators for permanent use have been installed and are in condition for service, the Contractor must remove the temporary enclosures, all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as required under the Contract.
- J. **INSPECTION:** Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection determines it necessary, the Contractor must furnish and install new governor and compensating ropes, new traveling cables, new controller parts, etc. The car and counterweight safeties must be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.
- K. **REPLACEMENT:** The Contractor must furnish and install new equipment or parts for any equipment or parts of the temporary elevator installations that have been damaged, destroyed, or that indicate excessive wear or corrosion, except the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheaves spaces used for temporary operation of elevators must be thoroughly cleaned down. Where lubricated rails are used they must be washed down; if roller guides are used, all rust, dirt, etc., must be removed from the rails. The full cost of parts replacement cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes.
- L. **LIMITATIONS ON USE:** The temporary elevators must not be used during their operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation, but only after such times as all plastering has been completed from the second floor up. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.



- M. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of one hundred dollars (\$100) per Day for each Day it fails to provide the temporary elevator service described in this Section beginning with the thirty-first (31st) Day after the twelfth (12th) floor slab, or that portion of the twelfth (12th) floor slab surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR EXISTING BUILDINGS:

- A. The Contractor may use, at the Commissioner’s discretion, one (1) selected elevator in the building for temporary operation by the Contractor for the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction over the Work at the Project. The operation of the temporary elevator and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. RESPONSIBILITY: The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.
- C. REPLACEMENT: The Contractor must furnish and install new equipment or parts for any equipment or parts of the elevator for temporary operation that have been damaged, destroyed, or that indicate excessive wear or corrosion, except the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheave spaces used for temporary operation of elevators must be thoroughly cleaned down. Where lubricated rails are used they must be washed down, if roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.
- D. LIMITATIONS ON USE: The temporary elevator must not be used during its operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer’s opinion will not overload or damage the elevator installation. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.
- E. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of one hundred dollars (\$100) per Day for each Day it fails to provide elevator services described in this section beginning with fifteen (15) Days from Notice to Proceed (NTP). This charge will be deducted from any amount due and owing to the Contractor.

3.4 TEMPORARY HOISTS AND HOISTWAYS (FOR MATERIAL AND PERSONNEL):

- A. RESPONSIBILITY: The Contractor must provide adequate numbers of material hoists for the most expeditious performance of all parts of the Work including the Work of all its subcontractors.
- B. LOCATIONS: No hoists must be constructed at such locations as to interfere with, or affect the construction of, floor arches or the Work of subcontractors. The hoists may be located at the exterior sides of the structure or in the courtyard and extend upward adjacent to the line of window openings. The hoists must be located a sufficient distance from the exterior walls and be so protected as to prevent any of the permanent Work from being damaged, stained or marred.



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- C. ELEVATOR SHAFT: Wherever possible, one or more of the permanent elevator shafts may be used as temporary hoistways, providing such use complies with the requirements of the Building Code of the City of New York, has been approved by the Commissioner, and does not interfere with the progress of the Work.
- D. PROTECTION FOR INTERIOR HOISTS: All interior material hoistways must be enclosed on each floor and must be adequately protected with appropriate safety guards. In no event must the protection be less than that required by law.

END OF SECTION 01 54 11



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**SECTION 01 54 23
TEMPORARY SCAFFOLDING AND PLATFORMS**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. SECTION 01 35 26 SAFETY REQUIREMENTS PROCEDURES.
- C. The Contractor must comply with the requirements of “*The City of New York Department of Design and Construction Safety Requirements*”. This document is included in the Information for Bidders.

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Temporary Scaffolding and Platforms, including:
 - 1. Conformance
 - 2. Responsibility
 - 3. Jobsite Documentation and Submittals
 - 4. Inspections
- B. This Section governs ALL scaffold used on DDC Project site(s), including but not limited to, Suspended Scaffold, Supported Scaffold, and Sidewalk Sheds.

1.3 CONFORMANCE:

- A. Unless otherwise indicated, the Contractor is responsible for providing, erecting, installing, and maintaining all temporary scaffolding and platforms which must comply with requirements of Chapter 33 (Safeguards During Construction or Demolition) of the New York City (NYC) Building Code, NYC Local Law 52 of 2005, OSHA Construction Standard 1926 Subpart L, and furnishing the items and personnel set forth in this Section.

1.4 RESPONSIBILITY:

- A. Jobsite Safety Coordinator: The Contractor must designate and employ a Jobsite Safety Coordinator, who must be a competent person, who must have a daily presence on the Project site during scaffold use. This designee must possess and maintain a valid New York City Department of Buildings (DOB) supported scaffold certificate of completion. An alternate must also be designated in the event that the Jobsite Safety Coordinator is absent. The Jobsite Safety Coordinator must:
 - 1. Verify completeness of documentation and submittals (as described below);
 - 2. Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected;
 - 3. Monitor trades using scaffold;
 - 4. Limit access to scaffold areas that are tagged for non-use;
 - 5. Inform trades of scaffold load limitations;
 - 6. Monitor loading of decks;
 - 7. Verify that any ties that are temporarily removed are properly restored in the same shift;
 - 8. Verify that outriggers and planks that are moved are properly set up and secured;
 - 9. Verify that all scaffold decks in use have proper access/egress;
 - 10. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards;



11. Notify appropriate parties, including but not limited to the Resident Engineer, Site Safety Coordinator / Monitor, Site Safety consultant, scaffold users, Contractor and the Scaffold Engineer, of misuses, non-conformances, hazards and accidents; and,
 12. Keep a log of significant actions and events connected with the scaffolding.
- B. The Contractor will be responsible for erecting, maintaining, and dismantling the scaffolding and/or sidewalk shed in conformance with requirements of the NYC Building Code, OSHA and the Contract Documents, including the Specifications. The Contractor must also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.
- C. The Contractor must require the subcontractor responsible for erecting the scaffolding to engage a Scaffold Engineer, licensed as a professional engineer by the State of New York. The Scaffold Engineer will be responsible to ensure the following: (1) that the installation design is in compliance with requirements of the NYC Building Code and OSHA, (2) that the design comports with the capabilities of the components and the characteristics of the site, (3) that scaffold loads on the host building, including netting, have been properly considered, and (4) that the design documents provide accurate information for erectors and users.
- D. Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a DOB-approved training provider are mandatory. These users have a duty to become familiar with the NYC Building Code and OSHA requirements germane to users, to obey the instructions of the Jobsite Safety Coordinator, and to inform the Jobsite Safety Coordinator of known hazards, non-conformances, or violations.

1.5 JOBSITE DOCUMENTATION AND SUBMITTALS:

The Contractor must prepare, obtain, and submit the following to the Resident Engineer:

- A. NYC DOB permit(s) for scaffold and sidewalk sheds (as applicable) including filing applications signed and sealed by a Professional Engineer licensed in the State of New York;
- B. Site logistics plan / site safety plan;
- C. Installation drawing(s), design, and product data to be provided for **all** scaffold(s) and shed(s) must include, at a minimum:
 1. Plan(s);
 2. Elevation(s);
 3. Duty load designation: "standard" (150 psf live load) or "heavy duty" (300 psf live load);
 4. Details including base support, anchors and ties;
 5. Notes and specifications including load limits, number of planked levels, tie spacing, netting, and sequence of installation and removal;
 6. Anchorage into sound material;
 7. Load limits based on pull tests;
 8. Specifications for pull test(s), method, proof load and the number of trials;
 9. Elevations, levels or heights, where anchorage is made into masonry;
 10. Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware;
 11. Samples for anchors, ties and netting;
 12. Sequence of operations for erection and demolition;
 13. Location plan, heights, widths, "jumps" over doorways and driveways;
 14. Specify size, maximum span and maximum spacing of headers and stringers;
 15. Specify legs, girts, braces, nailing and connections; and,
 16. All sidewalk sheds must be designed, engineered, signed, and sealed by a Professional Engineer licensed in the State of New York;
 - a. Generic (not job-specific) engineering drawings are satisfactory for standard sheds and arrangements.



- b. Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

1.6 INSPECTIONS:

- A. Signed inspection reports must be issued for each inspection and pull-test below, and must be logged and maintained on site by the Jobsite Safety Coordinator for the duration of the Project.
- B. Pull testing will be required during design, and during or post erection, where anchorage is made into masonry. The Scaffold Engineer must specify the test method, proof load, and the number of trials.
- C. Sidewalk sheds must be inspected after initial installation, major modification, or damage and thence every three months. Inspections must be by a Scaffold Engineer for custom sheds and by a Competent Person employed by the Contractor for standard sheds.
- D. Scaffolds must be inspected by the Scaffold Engineer during erection, post-erection, and prior to use and thence every three (3) months. The Scaffold Engineer must repeat inspections after major alteration/ modification, and/or damage.
- E. A Qualified Person assigned by the Contractor must inspect: the progress of erection and dismantling; and, the condition and integrity of the sidewalk sheds after high winds, major storms, and at least once per month during usage.
- F. A Qualified Person assigned by the Contractor must inspect: the progress of erection and dismantling at least weekly; and, the condition and integrity of the scaffold after high winds, major storms, and at least once per month during usage.
- G. Scaffolds and Sidewalk Sheds must be inspected daily by the Jobsite Safety Coordinator or alternate, prior to use by scaffold users. The inspection results must be recorded in the maintenance log and must always be available on-site.
- H. At the completion of the Project, submit all inspection documents as Miscellaneous Record Documents in accordance with SECTION 01 78 39 CONTRACT RECORD DOCUMENTS.

1.7 LADDERS AND STAIRS:

- A. The Contractor must provide and maintain ladders or temporary stairs extending from the street to the first story, and to and from every floor and roof level of the Project.

1.8 ACCESS AND EXITS:

- A. The ladders or temporary stairs must be of acceptable size, number and location, so that proper and convenient access may be had by those required to proceed to and from all parts of the Project.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 54 23



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**SECTION 01 60 00
PRODUCT REQUIREMENTS**

PART I – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.3 RELATED SECTIONS:

- A. Section 01 42 00 REFERENCES for applicable industry standards for products specified.

1.4 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Commissioner through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics are listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.



- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure.

1.5 ACTION SUBMITTALS

- A. Product Specification Submittals: Comply with requirements in Section 01 33 00 SUBMITTAL PROCEDURES. Show compliance with requirements.
- B. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Review Action: If necessary, Commissioner will request additional information or documentation for evaluation and will notify Contractor of approval or rejection of proposed comparable product request.
 - a. Format of Approval of Submittal: Per Article 1.6 of Section 01 33 00 SUBMITTAL PROCEDURES.
 - b. Use product specified, or products by Manufacturers specified if Commissioner does not issue a decision on use of a comparable product request.

1.6 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.



1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 5. Protect stored products from damage and liquids from freezing.

1.8 PRODUCT WARRANTIES

- A. Warranties specified in other Sections will be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of Guaranty obligations under requirements of the Contract Documents.
 - 1. **Manufacturer's Warranty:** Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to the City of New York.
 - 2. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for the City of New York.
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
 - 2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. **Submittal Time:** Comply with requirements in Section 01 77 00 CLOSEOUT PROCEDURES.



PART II – PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Descriptive, performance, and reference standard requirements in the Specifications establish required characteristics of products.
 - 2. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 3. Commissioner will review and approve products with warranties meeting the requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Commissioner will make selection.

- B. Or Approved Equal:
 - 1. Comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product, or for use of a product by an unnamed Manufacturer, as designated by the term "Or approved equal".
 - 2. Submit additional documentation required by Commissioner, in order to establish equivalency of proposed products. Evaluation of "Or approved equal" product status is by the Commissioner, whose determination is final.

- C. Product Selection Procedures:
 - 1. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products will be considered. Comply with requirements in "Comparable Products" Article for consideration of a product by an unnamed manufacturer. Products' listing is indicated by the following:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Manufacturer; Product designation
 - 2) Manufacturer; Product designation
 - 3) Manufacturer; Product designation
 - 4) Or approved equal

 - 2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed. Comparable products from unnamed Manufacturers will be considered. Comply with requirements in "Comparable Products" Article for consideration of a product by an unnamed manufacturer. Manufacturer's listing is indicated by the following:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Manufacturer
 - 2) Manufacturer
 - 3) Manufacturer
 - 4) Or approved equal



3. Basis-of-Design Product: Where Specifications name a basis-of-design product, provide the specified product, or a comparable product by one of the other named manufacturers. Drawings may indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Specifications indicate performance requirements and physical properties, durability and other special and required features that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers. Basis-of-Design Product listing is indicated by the following:
 - a. Subject to compliance with requirements, provide [product indicated on Drawings] [manufacturer's name; product name or designation] or comparable product by one of the following:
 - 1) Manufacturer
 - 2) Manufacturer
 - 3) Or approved equal
 4. Sole Source Product (Single Proprietary): Where Specifications name a single manufacturer and product, provide the named product. A Sole Source Product selection requires prior request by the Design Consultant and approval by the Commissioner for its inclusion in specifications. Sole Source Product is indicated by the following phrase listing:
 - a. Sole Source Product: Manufacturer's name and Product designation.
 - 1) No substitutions Permitted.
- D. Visual Matching Specification: Where Specifications require "match Commissioner's sample," provide a product that complies with requirements and matches Commissioner's sample. Commissioner's decision will be final on whether a proposed product matches.
- E. Visual Selection Specification: Where Specifications include the phrase "as selected by Commissioner from manufacturer's full range" or similar phrase, select a product that complies with requirements. Commissioner will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products (Or Approved Equal): Commissioner will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Commissioner may return requests without action, except to record noncompliance with these requirements:
- B. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
- C. Evidence that proposed product provides specified warranty.
- D. List of similar installations for completed projects with project names and addresses and names and addresses of architects and Owners, if requested.
- E. Samples, if requested.



- F. Submittal Requirements: Approval by the Commissioner of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements.
- G. Comply with all other specified product and submittal requirements.

PART III – EXECUTION (Not Used)

END OF SECTION 016000



**SECTION 01 60 00
PRODUCT REQUIREMENTS**

PART I – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.3 RELATED SECTIONS:

- A. Section 01 42 00 REFERENCES for applicable industry standards for products specified.

1.4 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Commissioner through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics are listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.



- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure.

1.5 ACTION SUBMITTALS

- A. Product Specification Submittals: Comply with requirements in Section 01 33 00 SUBMITTAL PROCEDURES. Show compliance with requirements.
- B. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Review Action: If necessary, Commissioner will request additional information or documentation for evaluation and will notify the applicable Contractor of approval or rejection of proposed comparable product request.
 - a. Format of Approval of Submittal: Per Article 1.6 of Section 01 33 00 SUBMITTAL PROCEDURES.
 - b. Use product specified, or products by Manufacturers specified if Commissioner does not issue a decision on use of a comparable product request.

1.6 QUALITY ASSURANCE

- A. Compatibility of Options: If the applicable Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.



1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 5. Protect stored products from damage and liquids from freezing.

1.8 PRODUCT WARRANTIES

- A. Warranties specified in other Sections will be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve the applicable Contractor of Guaranty obligations under requirements of the Contract Documents.
 - 1. **Manufacturer's Warranty:** Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to the City of New York.
 - 2. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for the City of New York.
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
 - 2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. **Submittal Time:** Comply with requirements in Section 01 77 00 CLOSEOUT PROCEDURES.



PART II – PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Descriptive, performance, and reference standard requirements in the Specifications establish required characteristics of products.
 2. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 3. Commissioner will review and approve products with warranties meeting the requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Commissioner will make selection.
- B. Or Approved Equal:
1. Comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product, or for use of a product by an unnamed Manufacturer, as designated by the term "Or approved equal".
 2. Submit additional documentation required by Commissioner, in order to establish equivalency of proposed products. Evaluation of "Or approved equal" product status is by the Commissioner, whose determination is final.
- C. Product Selection Procedures:
1. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products will be considered. Comply with requirements in "Comparable Products" Article for consideration of a product by an unnamed manufacturer. Products' listing is indicated by the following:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Manufacturer; Product designation
 - 2) Manufacturer; Product designation
 - 3) Manufacturer; Product designation
 - 4) Or approved equal
 2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed. Comparable products from unnamed Manufacturers will be considered. Comply with requirements in "Comparable Products" Article for consideration of a product by an unnamed manufacturer. Manufacturer's listing is indicated by the following:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Manufacturer
 - 2) Manufacturer
 - 3) Manufacturer
 - 4) Or approved equal



3. Basis-of-Design Product: Where Specifications name a basis-of-design product, provide the specified product, or a comparable product by one of the other named manufacturers. Drawings may indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Specifications indicate performance requirements and physical properties, durability and other special and required features that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers. Basis-of-Design Product listing is indicated by the following:
 - a. Subject to compliance with requirements, provide [product indicated on Drawings] [manufacturer's name; product name or designation] or comparable product by one of the following:
 - 1) Manufacturer
 - 2) Manufacturer
 - 3) Or approved equal
 4. Sole Source Product (Single Proprietary): Where Specifications name a single manufacturer and product, provide the named product. A Sole Source Product selection requires prior request by the Design Consultant and approval by the Commissioner for its inclusion in specifications. Sole Source Product is indicated by the following phrase listing:
 - a. Sole Source Product: Manufacturer's name and Product designation.
 - 1) No substitutions Permitted.
- D. Visual Matching Specification: Where Specifications require "match Commissioner's sample," provide a product that complies with requirements and matches Commissioner's sample. Commissioner's decision will be final on whether a proposed product matches.
- E. Visual Selection Specification: Where Specifications include the phrase "as selected by Commissioner from manufacturer's full range" or similar phrase, select a product that complies with requirements. Commissioner will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products (Or Approved Equal): Commissioner will consider the applicable Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Commissioner may return requests without action, except to record noncompliance with these requirements:
- B. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
- C. Evidence that proposed product provides specified warranty.
- D. List of similar installations for completed projects with project names and addresses and names and addresses of architects and Owners, if requested.
- E. Samples, if requested.



- F. Submittal Requirements: Approval by the Commissioner of the applicable Contractor's request for use of comparable product is not intended to satisfy other submittal requirements.
- G. Comply with all other specified product and submittal requirements.

PART III – EXECUTION (Not Used)

END OF SECTION 016000



**SECTION 01 73 00
EXECUTION**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes general procedural requirements governing execution of the Work including without limitation the following:
 - 1. Delivery of Materials
 - 2. Contractor's Superintendent
 - 3. Surveys
 - 4. Borings
 - 5. Examination
 - 6. Environmental Assessment
 - 7. Preparation
 - 8. Deferred Construction
 - 9. Installation
 - 10. Permits
 - 11. Transportation
 - 12. Sleeves and Hangers
 - 13. Sleeve and Hanger Drawings
 - 14. Cutting and Patching
 - 15. Location of Partitions
 - 16. Furniture and Equipment
 - 17. Removal of Rubbish and Surplus Material
 - 18. Cleaning
 - 19. Security and Protection of Work Site
 - 20. Maintenance of Site and Adjoining Property
 - 21. Maintenance of Project Site
 - 22. Safety Precautions for Control Circuits
 - 23. Obstructions in Drainage Lines
 - 24. Payment for Allowances
 - 25. Correction of the Work

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 33 00 SUBMITTAL PROCEDURES
- D. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS



1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Design Consultant	The entity responsible for providing design services for the Project, including, without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 QUALITY ASSURANCE:

- A. Land Surveyor Qualifications: A professional land surveyor who is licensed in the State of New York and who is experienced in providing land-surveying services of the kind indicated.

PART 1 - PRODUCTS (Not Used)

PART 2 - EXECUTION

3.1 DELIVERY OF MATERIALS:

- A. Material Orders: The Contractor must furnish to the Commissioner a copy of each material order, indicating date of order and quantity of material, and must also notify the Commissioner when materials have been delivered to the Site and in what quantities.
- B. Ample Quantities: The Contractor must deliver materials in ample quantities to ensure the most prompt and uninterrupted progress of the Work so as to complete the Work within the Contract time.
- C. Containers: The manufacturer's containers must be delivered with unbroken seals and must bear proper labels.
- D. Deliveries: The Contractor must coordinate deliveries in order to avoid delaying or impeding the progress of the Work.
- E. Handling: The Contractor must provide equipment and personnel to handle products by methods to prevent soiling or damage.
 - 1. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
 - 2. Promptly return damaged shipments or incorrect orders to manufacturer.
 - 3. For materials or equipment to be reused or salvaged, use special care in removal, storage and reinstallation to insure proper function in completed Work.
- F. Storage: Store products in accordance with provisions of Article 3.1 of the Standard Construction Contract, and periodically inspect to assure that stored products are undamaged and are maintained under required conditions.
- G. Stacking: All materials must be properly stacked in convenient places adjacent to the Site, or where directed, and protected in a satisfactory manner. Stacked materials must be arranged so as to not interfere with visibility of traffic control devices.



- H. Overloading: If the Commissioner permits the storage of materials in any part of the Project area, they must be so stored as to cause no overloading.
- I. No Interference: If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the Work or interfering with the Work to be done by any trade subcontractor, the Contractor must remove and restack such materials at no additional cost to the City.

3.2 CONTRACTOR'S CONSTRUCTION SUPERINTENDENT:

- A. Contractor's Construction Superintendent: The Contractor must devote its time and personal attention to the Work and must employ and retain at the Project Site, from commencement until Final Acceptance, a Contractor's Construction Superintendent. The Contractor's Construction Superintendent must be registered with the New York City Department of Buildings (DOB) in compliance with the Construction Superintendent Rule of the City of New York, be competent and capable of maintaining proper supervision and care of the Work, and be acceptable to the Commissioner. The Construction Superintendent, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, must see that the instructions of the Commissioner are carried out.
- B. Replacement: The Contractor's Construction Superintendent on the job must not be changed or removed without the consent of the Commissioner.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 SURVEYS:

- A. Line and Grade: The City will establish a baseline and bench mark near the Site of the Work for use by the Contractor in connection with the performance of the Work.
- B. Responsibility: The Contractor must establish all other lines and elevations required for the Work and must be solely responsible for the accuracy thereof.
- C. Safeguard All Points: The Contractor must safeguard all points, stakes, grade marks and bench marks made or established by the Contractor on the Work. The Contractor must re-establish same if disturbed, and bear the entire expense of rectifying the Work if improperly installed due to not maintaining, protecting or removing without authorization from the Commissioner such established points, stakes, or marks.
- D. City Monuments and Markers: No Work must be performed near City monuments or markers so as to disturb them until the said monuments or markers have been referenced or reset or otherwise disposed of by the relevant Agency or party who installed them.
- E. Foundations: The Contractor must furnish certification from a licensed Surveyor that all portions of the foundation Work are located in accordance with the Contract Drawings and at the elevations required thereby. This certification must show the actual locations and the actual elevations of all the Work in relation to the locations and elevations shown on the Contract Drawings, including, but not restricted to the following:
 - 1. The locations and elevations of all piles, if any.
 - 2. Elevations of tops of all spread footings, tops of pile caps, and tops of all foundation walls, elevator pit walls and ramp walls.
 - 3. Location of all footing centers and pier centers including those for exterior wall columns.
 - 4. Location of all foundation walls including wall columns, elevator pit walls and ramp walls.
- F. Wall Lines: After the first courses of masonry or stone have been laid, the Contractor must establish the permanent lines of exterior walls. The Contractor must promptly furnish certification from a licensed Surveyor in the form of signed original drawings showing the exact location of such wall lines of all portions



of all structures. Except at its own risk, the Contractor must not proceed further with the erection of walls until the Surveyor's certification has been submitted and verified for correct location of wall lines.

- G. Surveyor: The Surveyor selected for any of the purposes mentioned in Paragraph E and Paragraph F above, and Paragraph I below, must be a land Surveyor licensed in the State of New York and must be subject to the approval of the Commissioner. The Surveyor must not be a regular employee of the Contractor, nor must the Surveyor have any interest in the Contract. The Surveyor's certification must represent an independent and disinterested verification of all layout. The Surveyor must report to the Department of Design and Construction's (DDC) Resident Engineer each time upon arrival to and departure from the Site and review with the Resident Engineer the data required for the Project.
- H. Final Certification: Final certification must be submitted upon completion of the Work or upon completion of any subdivision of the Work as directed by the Commissioner. Any exceptions or deviations from the Contract Drawings must be noted on the final certificate and must include any maps, plates, notes, pertinent documents and data necessary, in the opinion of the Commissioner, to constitute a full and complete report.
- I. Final Survey: The Contractor must submit to DDC for submission to DOB a final Survey by the licensed Surveyor showing the location of the new Work, before completion of the Work. This Survey must show the location of the first tier of beams or of the first floor; the finish grades of the open spaces on the plot; the established curb level and the location of all other Work on the plan, together with the location and boundaries of the lot or plot upon which the Work is constructed, curb cuts, all yard dimensions, etc.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4

3.4 BORINGS:

- A. The work of this article must be the responsibility of the Contractor unless otherwise indicated.
- B. Reference Drawings: The boring drawings as listed on the title sheet are for information to the bidder and are to be used under the conditions as follows:
 - 1. Boring logs: shown on the boring drawings, record information obtained under engineering supervision in the course of exploration carried out by or under the direction of DDC at the Site.
 - 2. Soils and Rock Samples: All inferences are drawn from the indications observed as made by engineering and scientific personnel. All such inferences and all records of the Work, including soil samples and rock cores, if any, are available to bidders for inspection.
 - 3. Certification of Samples: The City certifies that the Work was carried out as stated, and that the soil samples and rock cores were actually taken from the site at the times, places, and in the manner indicated on the boring drawings. The samples are available for inspection in DDC's Subsurface Exploration Unit.
 - 4. Bidder's Responsibility: The bidder, however, is responsible for any conclusions to be drawn from the Work. If the bidder accepts those of the City, it must do so at its own risk. If the bidder prefers not to assume such risk, the bidder is under the obligation of employing its own experts to analyze the available information and must be responsible for any consequences of acting on their conclusions.
 - 5. Continuity Not Guarantee: The City does not guarantee continuity of conditions shown at actual boring locations over the entire Site. Where possible, borings are located to avoid all obstructions and previous construction which can be found by inspection of the surface. The bidder is required to estimate the influence of such features from its own inspection of the Site.



3.5 EXAMINATION:

- A. Existing Conditions: The existence and location of Site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning the Work, the Contractor must investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, the Contractor must verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground utilities and other construction indicated as existing are not guaranteed. Before beginning Site Work, the Contractor must investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, the Contractor must verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water-service piping, and underground electrical services.
 - 2. The Contractor must furnish location data for Work related to the Project that must be performed by public utilities serving the Project Site.
- C. Acceptance of Conditions: Examine all existing substrates, areas, and conditions, with the subcontractor responsible for installation or application, for compliance with requirements for installation tolerances and other conditions affecting performance. The Contractor must record observations of these examinations:
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.6 ENVIRONMENTAL ASSESSMENTS:

- A. City Responsibilities: An Environmental Assessment and survey is performed by DDC and its findings are included in the Contract Documents. In accordance with the NYC Administrative Code Title 15 Chapter 1, an asbestos survey is required to be performed by an Asbestos Investigator certified by the NYC Department of Environmental Protection (DEP) to identify the presence of asbestos containing material (ACM) prior to any alteration, renovation, or demolition activity. The findings of such survey are required for the submission of approvals and permits issued by DOB. When the findings indicate that asbestos containing material is present and will be disturbed during the alteration, renovation, or demolition activity, then abatement design specifications will be incorporated into the Contract Documents. The Contractor must comply with all federal, state and local asbestos regulations affecting the work for this Contract.
- B. Contractor Responsibility: The Contractor must comply with all federal, state and local environmental regulations, including without limitation, United States Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, which require the Contractor to assess if lead-based paint will be disturbed during the Work in order to protect the Contractor's workers and the building occupants from migration of lead dust into the air. The Contractor must comply with all federal, state and local environmental waste disposal regulations which may be required during the Work. The Contractor is required to hire licensed abatement and disposal companies for the requisite Work.

3.7 PREPARATION:

- A. Field Measurements: The Contractor must verify all dimensions and conditions on the Site so that all Work will properly join the existing conditions.



- B. Before commencing the Work, the Contractor must examine all adjoining materials on which its Work is in any way dependent on good workmanship in accordance to the intent of the Specifications and the Contract Drawings. The Contractor must report to the Commissioner any condition that will prevent it from performing Work that conforms to the required Specifications.
- C. Existing Utility Information: The Contractor must furnish information to the Commissioner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Additionally, the Contractor must coordinate with authorities having jurisdiction.
- D. Space Requirements: The Contractor must verify space requirements and dimensions of items shown diagrammatically on the Contract Drawings.

3.8 DEFERRED CONSTRUCTION:

- A. In order to permit the installation of any item or items of equipment required to be furnished and installed within the time allowed for completing the Work of the Contract, the Contractor must defer construction Work limited to adequate areas as approved and certified by the Commissioner.
- B. The Contractor must confer with the affected trade subcontractors and ascertain arrangements, time, and facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

3.9 INSTALLATION:

- A. General: The Contractor must locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical Work plumb and make horizontal Work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated on the Contract Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory-prepared and field-installed. Check shop drawings of other work and work of trade subcontractors to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Design Consultant.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral



anchors that are to be embedded in concrete or masonry. Deliver such items to Project Site in time for installation.

- H. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.10 PERMITS:

- A. The Contractor must comply with all local, state and federal laws, rules, and regulations affecting the Work of this Project, including, without limitation, (1) obtaining all necessary permits for the performance of the Work prior to commencement thereof, and (2) complying with all requirements for the disposal of demolition and/or construction debris, waste, etc., including disposal in City landfills. The Contractor must be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

3.11 TRANSPORTATION:

- A. Availability: The Contractor must determine the availability of transportation facilities and dockage for the use of its employees, equipment, and materials, and the conditions under which such use will be permitted.
- B. Costs: If transportation facilities and dockage are available and are permitted to be used by the governmental agency having jurisdiction, the Contractor must pay all necessary costs and expenses, and abide by all rules and regulations promulgated in connection therewith.
- C. Vehicles: With respect to the use of vehicles on highways and bridges, the Contractor's attention is directed to the limitations set forth in the Rules of the City of New York, Title 34, Chapter 4, Section 4-15.
- D. Continued Use: It is understood that the Commissioner makes no warranty as to the continued use by the Contractor of such facilities.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.12

3.12 SLEEVES AND HANGERS:

- A. Coordinate with Progress Schedule: The Contractor must promptly furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment that is to be built into the Work in conformity with the requirements of the Project.
- B. Cooperation of Subcontractors: All subcontractors must fully cooperate with each other in connection with the performance of the above Work as "cutting in" new work is neither contemplated nor will it be tolerated.
- C. Timeliness: To avoid delay, in the event that timely delivery of sleeves and other materials cannot be made, the Contractor may arrange to have boxes or other forms set at the locations where the piping or other material is to pass through or into the slabs, walls or other Work. Upon the subsequent installation of the sleeves or other material, the Contractor must fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in must be borne by the Contractor.
- D. Inserts: The Contractor is to install strip inserts four (4) foot on center and perpendicular to beams in ceiling slabs of boiler, machine, and mechanical equipment rooms. Inserts are to be installed for strippable concrete slabs only.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.13

3.13 SLEEVE AND PENETRATION DRAWINGS:

- A. As soon as practicable after the commencement of Work, and when the order in which concrete for the first slabs, walls, etc. to be poured is determined, the Contractor must submit to DDC a sketch indicating the location and size of all penetrations for sleeves, ducts, etc. which will be required to accommodate the mechanical trades in order to determine if such penetrations will materially weaken the Project's structure.



The sketch must be stamped and returned if approved and/or comments will be transmitted. The Contractor must continue to submit sketches as the pouring schedule and the concrete Work progresses and until approvals for the penetration sketches have been given. The Contractor must not predicate its layout Work on unapproved sketches.

3.14 CUTTING AND PATCHING:

- A. Responsibility: The Contractor must do all cutting, patching, and restoration required by its Work, unless otherwise particularly specified in the Specifications.
- B. Restore Work: The Contractor must restore any Work damaged during the performance of the Work.
- C. Competent Workers: All restoration Work must be done to the satisfaction of the Commissioner by competent workers skilled in the trade required by such restoration. If, in the judgment of the Commissioner, workers engaged in restoration Work are incompetent, they must be replaced immediately by competent workers.
- D. Structural Elements: Do not cut and patch structural elements without the prior approval, in writing, of the Resident Engineer.
- E. Operational Elements: Do not cut and patch operating elements and related components.
- F. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Commissioner's opinion, reduce the building's aesthetic qualities. The Contractor must remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- G. Existing Warranties: The Contractor must remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.
- H. Removals: The Contractor must remove from the premises all demolished materials of every nature or description resulting from cutting, patching, and restoration work, in accordance with the requirements hereinafter stipulated under Sub-Section 3.17 herein and as further required in Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.15

3.15 LOCATION OF PARTITIONS:

- A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor must immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.

3.16 FURNITURE AND EQUIPMENT:

- A. Responsibility: The Contractor is responsible for moving all loose furniture and/or equipment in all areas where the location of such furniture and/or equipment interferes with the proper performance of its Work.
- B. Protection: All such furniture and/or equipment must be adequately protected with dust cloths and returned to their original locations when directed to do so by the Resident Engineer.

3.17 REMOVAL OF RUBBISH AND SURPLUS MATERIALS:

- A. Of the waste that is generated during demolition, as many of the waste materials as economically feasible must be reused, salvaged, or recycled. Waste disposal in landfills must be minimized. Comply with requirements of Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.



- B. Rubbish: Rubbish must not be thrown from the windows or other parts of the Project. Mason's rubbish, dirt and other dust-producing material must be wetted down periodically.
- C. Location: The Contractor must clean the Project Site and Work area daily, sweep up, and deposit at a location designated on each floor, all of its rubbish, debris, and waste materials as it accumulates or more frequently when directed by the Resident Engineer. Wood crating must be broken up, neatly bundled, tied, and stacked ready for removal and be deposited at a location designated on each floor.
 - 1. Comply with requirements in NYC Fire Department for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than seven (7) Days during normal weather or three (3) Days if the temperature is expected to rise above 80 degrees F (27 degrees C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- D. Laborers: Since the Contractor is responsible for the removal of all rubbish, etc., from the Site, the Contractor must employ and keep engaged for this purpose an adequate number of laborers.
- E. Surplus Materials: The Contractor must remove from the Site all surplus materials when there is no further use for same.
- F. Tools and Materials: At the conclusion of the Work, all erection plant, tools, temporary structures and materials belonging to the Contractor must be promptly removed.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

3.18 CLEANING:

- A. The Contractor must thoroughly clean all equipment and materials furnished and installed, and must deliver such materials and equipment undamaged in a clean and new appearing condition up to date of Final Acceptance.
- B. Site: Maintain Project Site free of waste materials and debris.
- C. Installed Work: Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of the product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration up to date of Final Acceptance.
- F. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration up to date of Final Acceptance.

3.19 SECURITY AND PROTECTION OF WORK SITE:

- A. Provide protection of installed Work, including appropriate protective coverings, and maintain conditions that ensure installed Work is without damage or deterioration up to date of Final Acceptance.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Secure and protect Work and Work Site against damage, loss, injury, theft and/or vandalism.
- D. Maintain daily sign-in sheets of workers and visitors and make the sheets available to the Commissioner.



3.20 MAINTENANCE OF SITE AND ADJOINING PROPERTY:

- A. The Contractor must take over and maintain the Project Site, after order to start Work.
- B. The Contractor must be responsible for the safety of the adjoining property, including sidewalks, paving, fences, sewers, water, gas, electric and other mains, pipes and conduits etc. until the date of Final Acceptance. The Contractor must, at its own expense, except as otherwise specified, protect same and maintain them in at least as good a condition as that in which the Contractor finds them.
- C. All pavements, sidewalks, roads and approaches to fire hydrants must be kept clear at all times, maintained and repaired to serviceable condition with materials to match existing.
- D. Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian traffic.
- E. The Contractor must also remove all snow and ice as it accumulates on the sidewalks within the Contract Limits Lines.

3.21 MAINTENANCE OF PROJECT SITE:

- A. The Contractor must take over and maintain all Project areas, after order to start Work.
- B. Until the date of Final Acceptance, the Contractor must be responsible for the safety of all Project areas, including water, gas, electric and other mains and pipes and conduits and must, at the Contractor's own expense, except as otherwise specified, protect same and maintain them in at least as good condition as that in which the Contractor finds them.
- C. All pavements, sidewalks, roads and approaches to fire hydrants must be kept clear at all times, maintained, and if damaged, repaired to serviceable conditions with materials to match existing.
- D. The Contractor must keep the space for the Resident Engineer in a clean condition.

3.22 SAFETY PRECAUTIONS FOR CONTROL CIRCUITS:

- A. Control circuits, the failure of which will cause a hazard to life and property, must comply with DOB Bureau of Electrical Control requirements.

3.23 OBSTRUCTIONS IN DRAINAGE LINES:

- A. The Contractor must be responsible for all obstructions occurring in all drainage lines, fittings, and fixtures after the installations and cleaning of these drainage lines, fittings, and fixtures, as certified by the Resident Engineer. Roof drains must be kept clear of any and all debris. Any stoppage must be repaired immediately at the expense of the Contractor.

3.24 PAYMENT OF ALLOWANCES:

- A. Unless otherwise called for in the Specifications, the following requirements apply to the payment and execution of Allowances established for the Contractor:
 - 1. Allowances are to be utilized when ordered and authorized in writing by the Commissioner.
 - 2. The Contractor will be paid on a time and materials (T&M) basis under the Allowance. Labor will be paid based on the Contractor's Certified Payrolls, all other expenses will be paid on an invoice basis. A markup of twelve percent (12%) for overhead and ten percent (10%) for profit will be allowed, except that no markup will be allowed on Payroll Taxes or on the premium portion of overtime pay or on sales and personal property taxes.



3.25 CORRECTION OF THE WORK

- A. Subject to the terms of the Contract, the Contractor must complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Contractor must repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 73 00



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

(No Text on This Page)



**SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND
DISPOSAL**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes administrative and procedural requirements for the management and disposal of construction waste and includes the following requirements:
 - 1. Waste Management Goals
 - 2. Waste Management Plan
 - 3. Progress Reports
 - 4. Progress Meetings
 - 5. Management Plan Implementation
- B. This section includes:
 - 1. Definitions
 - 2. Waste Management Performance Requirements
 - 3. Reference Resources
 - 4. Submittals
 - 5. Quality Assurance
 - 6. Waste Plan Implementation
 - 7. Additional Demolition and Salvage Requirements
 - 8. Disposal

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- D. Section 01 73 00 EXECUTION
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- G. Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's LEED Rating System, as specified in Section 01 81 13.03 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS" or Section 01 81 13.04 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS".

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.



<u>Term</u>	<u>Definition</u>
Alternative Daily Cover (ADC)	Material other than earthen material placed on the surface of the active face of a municipal solid Waste landfill at the end of each Work Day to control vectors, fires, odors, blowing litter and scavenging.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Clean	Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
Construction and Demolition (C&D) Waste	Solid Wastes typically including building materials, trash debris and rubble resulting from remodeling, repair and demolition operations. Hazardous materials and land clearing Waste are not included.
Diversion from Landfill	Material removal from the Site for Recycling, Reuse or Salvage that might otherwise be sent to a landfill.
Off-site Sorting	Material types that are combined on the project site and hauled away for sorting. Measured weights only. Approximations of weight or volume based on visual inspection are not acceptable. <ul style="list-style-type: none"> a. Off-site Sorting Method 1: Diversion Rate derived from the weight of the individual diverted material type divided by the weight of the commingled waste. Individual diverted material types handled through this sorting method are each counted as an individual diverted material type. b. Off-site Sorting Method 2: Diversion Rate derived from the waste sorting facility average diversion rate, multiplied by the weight of the commingled waste. All diverted materials handled through this sorting method are counted as a single diverted material type.
On-site Sorting	Material types that have been sorted in segregated containers or project areas for removal as segregated diverted material types. Measured weights only. Approximations of weight or volume based on visual inspection are not acceptable. <ul style="list-style-type: none"> a. On-site Sorting: Diversion Rate derived from the weight of the diverted material type. Material diverted through this sorting method are each counted as an individual diverted material type.
Recyclable	The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
Recycle (recycling)	To sort, separate, process, treat or reconstitute solid Waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying Waste.
Return	To give back Reusable items or unused products to vendors.



Reuse	To reuse excess or discarded construction material in some manner on the Project Site.
Salvage	To remove a Waste material from the Project Site for resale or reuse.
Waste	Extra material or material that has reached the end of its useful life in its intended use. Waste includes Salvageable, Returnable, Recyclable and Reusable material.
Waste Management Plan	A Project-related plan for the collection, transportation and disposal of Waste generated at the construction Site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.
Waste-to-Energy	The conversion of non-Recyclable Waste materials into usable heat, electricity or fuel through a variety of processes, including combustion, gasification, pyrolization, anaerobic digestion and landfill gas recovery.

1.5 WASTE MANAGEMENT PERFORMANCE REQUIREMENTS:

- A. The City of New York has established that this Project must generate the least amount of Waste possible and employ processes that ensure the generation of as little Waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors.
- B. Of the Waste that is generated during demolition, as many of the Waste materials as economically feasible, and as stated here, must be Reused, Salvaged, or Recycled. Waste disposal in landfills must be minimized.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.5 C

- C. LEED CERTIFICATION: The City of New York will seek Leadership in Energy and Environmental Design (LEED) certification for this Project as indicated in the Addendum to the General Conditions from the U.S. Green Building Council. The documentation required here will be used for this purpose. LEED awards points for a variety of sustainable design measures on a project, one of which is the Reuse and Recycling of project Waste.
- D. DIVERSION REQUIREMENTS. With the exception of LEED v4 projects with demolition ADC Waste, a minimum of seventy-five percent (75%) of total Project demolition and construction Waste (by weight) must be diverted from landfill through at least four (4) diverted material types. LEED v4 projects with demolition ADC Waste must divert a minimum of fifty percent (50%) of total Project demolition and construction Waste (by weight) from landfill through at least three (3) diverted material types. The following Waste categories are likely candidates to be included in the diversion plan as applicable for this Project:
 - 1. Concrete;
 - 2. Bricks;
 - 3. Concrete masonry units (CMU);
 - 4. Asphalt;
 - 5. Metals (e.g. banding, stud trim, ceiling grid, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze);
 - 6. Clean dimensional wood;



7. Carpet and pad;
 8. Drywall;
 9. Ceiling tiles;
 10. Cardboard, paper and packaging; and
 11. Reuse items indicated on the Contract Drawings and/or elsewhere in the Specification.
- E. All fluorescent lamps, High Intensity Discharge lamps and mercury-containing thermostats removed from the Site must be Recycled. Do not use bulb crusher on Site.
- F. Recycling on the job, subject to the Commissioner's approval, is encouraged on the Site itself, such as the crushing and reuse of removed sound concrete and stone. Include these categories in the Waste Management Plan.
- G. Land-clearing debris is not considered construction, demolition or renovation Waste and is not to be included as contribution to Waste diversion.
- H. A minimum of five (5) material types, both structural and nonstructural, are to be identified in the Construction Waste Management Plan for diversion.
- I. For LEED v4 projects, material to be used as ADC does not qualify as material diverted from disposal.

1.6 REFERENCES, RESOURCES:

- A. DDC encourages its Contractors to seek information from websites and experts in Salvage or Recycling in order to minimize disposal costs. There are numerous opportunities to sell, Salvage, or to donate materials and accrue tax benefits (which would accrue to the Contractor responsible for removal); there are also outlets that will pick up, and in some cases, buy Recyclable materials. Examples of information resources are as follows:
1. A standard Construction and Demolition (C&D) Waste Management Log form is available through DDC's Sustainable Design website:
<https://www1.nyc.gov/assets/ddc/downloads/Sustainable/forms-local-law-86/waste-tracking-form.pdf>.
 2. Web Resources (information only; no warranty or endorsement is implied):
 - a. www1.nyc.gov/assets/donate/site/ – Website of donateNYC, a network of nonprofit organizations in New York City that accept and distribute second-hand and surplus goods.
 - b. www.bignyc.org – Website of Build It Green NYC, a non-profit outlet for Salvaged and surplus building materials.
 - c. www.usgbc.org – Website of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D Waste Recycling.
 - d. www.epa.gov/smm/sustainable-management-construction-and-demolition-materials – Website of the U.S. Environmental Protection Agency (EPA) that discusses C&D Waste issues, and links to other resources.
 3. Waste-to-Energy Facilities that need to comply with European Standard (EN) for Waste management and emissions into air, soil, surface water and groundwater:
 - a. www.ec.europa.eu/environment/waste/framework/index.htm – European Commission Waste Framework Directive 2008/98/EC.
 - b. <https://eur-lex.europa.eu/homepage.html> - European Commission Waste



Incineration Directive 2000/76/EC.

- c. www.cen.eu/cen/Products – EN Standards 303-1, 303-2, 303-3, 303-4, 303-5, 303-6, 303-7.

1.7 SUBMITTALS:

- A. The Contractor must refer to Section 01 33 00 SUBMITTAL PROCEDURES for submittal requirements.
- B. The Contractor must be responsible for the development and implementation of a Waste Management Plan for the Project. The Contractor's subcontractors must assist in the development of that Plan, and collect and deposit their Waste and Recyclable materials in accordance with the approved Plan.
- C. Draft Waste Management Plan: Within fifteen (15) Days after receipt of the Notice to Proceed (NTP), or prior to any Waste removal, whichever occurs sooner, the Contractor must submit to the Commissioner a Draft Waste Management Plan. Include separate sections for C&D Waste. The Plan must demonstrate how the performance goals will be met, and contain the following:
1. List of material types targeted for Reuse, Salvage, or Recycling, and names, addresses, and phone numbers of receiving facilities/companies that will be purchasing or accepting each material. Each material listed is to include estimated amount in tons and percentage of overall construction waste of each of the material streams.
 2. Estimation of the percentage of overall construction waste that will be sent to landfill.
 3. Description of on-Site and/or off-Site sorting methods for all materials to be removed from Site. Off-site sorting methods must be categorized as Off-site Sorting Method 1 or Off-site Sorting Method 2.
 4. If mixed C&D Waste is to be sorted off-Site, provide a letter from the processor stating the average percentage of mixed C&D Waste they Recycle. Waste processor's average percentage of mixed C&D waste must not include Alternative Daily Cover as a recycled material for LEED v4 projects.
 5. Landfill information: Names of landfills where non-Recyclable/reusable/salvageable Waste will be disposed, and list of applicable tipping fees.
 6. Material handling procedures: Specify whether materials must be separated or commingled and describe the planned diversion strategies. Describe expected amount of each material type, where materials must be taken and how the Recycling facility must process the material. Provide a description of the means by which any Recyclable, Salvaged, or Reused materials will be protected from contamination and collected in a manner that will meet the requirements for acceptance by the designated Recycling processors.
 7. Transportation: A description of the means of transportation and destination for Recycled materials.
 8. Meetings: Regular meetings must be held monthly, or as directed by the Commissioner, and the Contractor must provide a description of these meetings to address Waste management.
 9. Sample spreadsheet and description of how the implementation of the Plan will be documented and submitted on a monthly basis.
- D. Final Waste Management Plan: Within fifteen (15) Days of Commissioner's approval of the Draft Waste Management Plan, the Contractor must submit a Final Waste Management Plan.
- E. Progress Reports: The Contractor must submit a monthly Waste Management Progress Report, containing the following information:



1. Project title, name of company completing report, and dates of period covered by the report.
 2. Report on the disposal of all Project Site Waste. A DDC C&D Waste Management Log form is included at the end of this section. For each shipment of material removed from the Site, provide the following:
 - a. Date and ticket number of removal;
 - b. Identity of material hauler;
 - c. Material type;
 - d. Waste sorting method;
 - e. Total quantity of Waste, in tons/cubic yards, by type;
 - f. Quantity of Waste Salvaged, Recycled and/or Reused, by type;
 - g. Total quantity of Waste diverted from landfill (Recycled, Salvaged, Reused) as a percentage of total Waste; and
 - h. Recipient of each material type.
 3. Provide monthly and cumulative Project totals of Waste, quantity diverted, and percentage diverted.
 4. Note that the unit of measurement may be either tons or cubic yards but must be consistent for all shipments and all materials throughout the Project. Reports with inconsistent or mixed units will not be reviewed and will be Returned for re-submission.
 5. Include legible copies of on-Site logs, weight tickets and receipts. Receipts must be from charitable organizations, Recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, Recycling or disposal. Contractor must save such original documents for the life of the Project plus seven (7) years.
- F. LEED Submittal: For LEED-designated projects, submit final LEED construction Waste report signed by the Contractor, tabulating total Waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met. Waste report must include:
1. At least four (4) material streams for diverted materials;
 2. Documentation of Recycling rates for commingled facilities; and
 3. For Waste-to-Energy strategy, submit documentation of facility adherence to relevant EN standards, and justification for the strategy.
- G. Refrigerant Recovery: Where refrigerant is recovered, submit statement of refrigerant recovery, which must include:
1. Name, address, qualification data and signature of the refrigerant recovery technician responsible for recovering refrigerant;
 2. Statement that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations; and
 3. Date refrigerant was recovered.



1.8 QUALITY ASSURANCE:

- A. The Contractor must designate a Construction Waste Management Representative to ensure compliance with this section. The Representative must be present at the Project Site full-time and for the duration of the Project.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Plans, documentation, and implementation must be discussed at the following meetings:
 - 1. Pre-demolition kick-off meeting;
 - 2. Pre-construction kick-off meeting;
 - 3. Regular job-site meetings; and
 - 4. Contractor toolbox meetings.
- E. For LEED v4 projects, Waste-to-Energy Facilities: Comply with EN standards for Waste management and emissions into air, soil, surface water, and groundwater.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 WASTE PLAN IMPLEMENTATION:

- A. Prior to the demolition and construction start, the Contractor must implement the Waste Management Plan, coordinate the Plan with all affected trades, and designate one individual as the Construction Waste Management Representative. The Representative will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis and for assembling the required LEED documentation.
- B. The Contractor must be responsible for the provision of containers and the removal of all Waste, non-Returned surplus materials and rubbish from the Site in accordance with the approved Waste Management Plan. The Contractor must oversee and document the results of the Plan. Monies received for Salvaged materials must remain with the Contractor, except the monies for those items specifically identified elsewhere in the specifications or indicated on the Contract Drawings as belonging to others.
- C. Responsibilities of subcontractors: Each subcontractor must be responsible for collecting its Waste, non-Returned surplus materials and rubbish, in accordance with the Waste Management Plan.
- D. Distribution: The Contractor must distribute copies of the Waste Management Plan to each subcontractor, Resident Engineer, Construction Manager, and the Commissioner.
- E. Instruction: The Contractor must provide on-Site instruction of proper Waste management procedures to be used by all parties at appropriate stages of the Project.
- F. Procedures: Conduct Waste management operations to ensure minimum interference with Site vegetation, roads, streets, walkways and other adjacent, occupied, and used facilities. The waste management operations include, but are not limited to:
 - 1. Collect commingled Waste and/or separate all Recyclable Waste in accordance with the Plan. Specific areas on the Project Site are to be designated, and appropriate containers and bins clearly marked with acceptable and unacceptable materials.
 - 2. Inspect containers and bins for contamination and remove contaminated materials if found. Comply with requirements in the following General Conditions sections for controlling dust



and dirt, environmental protection, and noise control: Section 01 81 19 - INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS, Section 01 81 13.03 - SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 - SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS, Section 01 10 00 – SUMMARY, Section 01 35 26 - SAFETY REQUIREMENTS PROCEDURES, Section 01 50 00 - TEMPORARY FACILITIES, SERVICES AND CONTROLS, and Section 01 73 00 – EXECUTION..

3.2 ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS:

- A. Demolition and Salvage of additional items indicated in other sections of the Project Specifications require special attention as part of the overall seventy-five percent (75%) Diversion from Landfill. Specific requirements for special attention are designated in other sections of the Project Specifications.

3.3 DISPOSAL:

- A. General: Except for items or material to be Salvaged, Recycled, or otherwise Reused, remove Waste material from the Project Site and legally dispose of them in a manner acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow Waste materials that are to be disposed of to accumulate on Site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn Waste materials.
- C. Disposal: Transport Waste materials off Project Site and legally dispose of them.

END OF SECTION 01 74 19



Project Name: _____
Project I.D.: _____

Contractor: _____
Prepared by: _____
For Month: _____

Table with columns: Haul Date, Ticket #, Hauling Company, *Material Type, Sorting Method, Material Quantity (*Total Weight, Excluded Material, *Diverted Material, *Landfilled Material), *Material Recipient. Includes summary rows for Monthly Totals and Cumulative Totals.

Notes:

- 1. Volume (cubic yards) may be used instead of weight if used for ALL amounts and ALL materials.
2. Includes concrete; bricks; concrete masonry units (CMU); asphalt; metals; clean dimensional wood; carpet and pad; drywall; ceiling tiles; cardboard, paper, and packaging; and any other Reuse items indicated on the Contract Drawings and/or elsewhere in the Specifications.
3. Excluded material includes soil or land clearing debris and for LEED v4 projects, Alternative Daily Cover (ADC) such as screen fines and 6" minus.
4. Diverted material includes Recycled and Reused material diverted from landfill. Recycled material is reprocessed into new products. Reused material is reclaimed, Salvaged or otherwise used in its original form, either on-site or off-site.
5. Sorting Method must be classified as On-Site Sorted, Off-Site Sorted Method 1, or Off-Site Sorted Method 2.
* These items must be listed in order to receive LEED credit.



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

(No Text on This Page)



**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes administrative and general procedural requirements for Closeout Procedures, including, without limitation, the following:
 - 1. Definitions
 - 2. Substantial Completion
 - 3. Final Acceptance
 - 4. Warranties
 - 5. Final Cleaning
- B. LEED: Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's (USGBC) Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
- C. COMMISSIONING: Refer to the Addendum to identify whether this Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED- NC procedures, as described in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE. The Contractor must cooperate with the Commissioning Agent and provide whatever assistance is required.

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
- D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- E. Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.



<u>Term</u>	<u>Definition</u>
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection to determine the date of Substantial Completion, the Contractor must complete and supply all items required by the Contract Specifications, General Conditions, Addendum to the General Conditions, change orders or other directives from the Commissioner’s representatives. The required items will include all Contract requirements for Substantial Completion, including, but not limited to, items related to releases, regulatory approvals, warranties and guarantees, record documents, testing, demonstration and orientation, final clean up and repairs, and all specific checklist of items by the Resident Engineer. (See Attachment “A” at the end of this section for sample requirements for Substantial Completion).
- B. The Contractor must prepare and submit a list to the Resident Engineer of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
- C. Inspection: The Contractor must submit to the Resident Engineer a written request for inspection for Substantial Completion. Within ten (10) Days of receipt of the request, the Resident Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, client agency representative and/or other entities having involvement with the Work to assist in the inspection of the Work. If the Resident Engineer makes a determination that the Work is Substantially Complete and approves the Final Approved Punch List and the date for Final Acceptance, he/she will so advise the Commissioner and recommend issuance of the Certificate of Substantial Completion. If the Resident Engineer determines that the Work is not substantially complete, he/she will notify the Contractor of those items that must be completed or corrected before the Certificate of Substantial Completion will be issued.
 - 1 Re-inspection: Contractor must request re-inspection when the Work identified in previous inspections as incomplete are completed or corrected.
 - 2 Results of completed inspection will form the basis of the requirements for Final Acceptance.

1.6 FINAL ACCEPTANCE:

- A. Preliminary Procedures: Before requesting final inspection for Final Acceptance of the Work, the Contractor must complete the following. (Note that the following are to be completed, submitted as appropriate, and approved by the Commissioner, as applicable, prior to the final inspection and are not to be submitted for approval or otherwise at the final inspection unless specifically indicated). List exceptions in the request.
 - 1. Verify that all required submittals have been provided to the Commissioner including, but not limited to, the following:
 - a. Manufacturer’s cleaning instructions;
 - b. Posted instructions;
 - c. As-built Contract Documents (Drawings, Specifications, and product data) as described in Section 01 78 39 CONTRACT RECORD DOCUMENTS, incorporating any changes required



- by the Commissioner as a result of the review of the submission prior to the pre-final inspection;
- d. Operation and maintenance manuals, including preventive maintenance, special tools, repair requirements, parts list, spare parts list, and operating instructions;
 - e. Completion of required demonstration and orientation, as applicable, of designated personnel in operation and maintenance of systems, sub-systems and equipment;
 - f. Applicable LEED Building submittals as described in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS; and
 - g. Construction progress photographs as described in Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.
2. Submit a certified copy of the Final Approved Punch List of items to be completed or corrected. The certified copy of the Punch List must state that each item has been completed or otherwise resolved for acceptance, and must be endorsed and dated by the Contractor.
 3. Submit pest-control final inspection report and survey as required in Section 01 50 00 TEMPORARY FACILITIES AND CONTROLS.
 4. Submit record documents and similar final record information.
 5. Deliver tools and similar items.
 6. Complete final clean-up requirements including touch-up painting of marred surfaces.
 7. Submit final meter readings for utilities, as applicable, a measured record of stored fuel, and similar data as of the date when the City took possession of and assumed responsibility for corresponding elements of the Work.
- B. Final Inspection: The Contractor must submit to the Resident Engineer a written request for inspection for Final Acceptance of the Work. Within ten (10) Days of receipt of the request, the Resident Engineer will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, client agency representative and/or other entities having involvement with the Work to assist in the inspection of the Work. If the Resident Engineer finds that all items on the Final Approved Punch List are complete and no further Work remains to be done, he/she will so advise the Commissioner and recommend the issuance of the determination of Final Acceptance. If the Resident Engineer determines that the Work is not complete, he/she will notify the Contractor of those items that must be completed or corrected before the determination of Final Acceptance will be issued.
- C. Final Acceptance: The Work will be accepted as final and complete as of the date of the Resident Engineer's inspection if, upon such inspection, the Resident Engineer finds that all items on the Final Approved Punch List are complete and no further Work remains to be done. The Commissioner will then issue a written determination of Final Acceptance.

1.7 WARRANTIES:

- A. Schedule B of the Addendum lists the items of materials and/or equipment for which manufacturer warranties are required. For each item of material and/or equipment listed in Schedule B, the Contractor must obtain a written warranty from the manufacturer. Such warranty must provide that the material or equipment is free from defects for the period set forth in Schedule B and will be replaced or repaired within such specified period. The Contractor must deliver all required warranties to the Commissioner.
- B. Unless indicated otherwise, warranties are to take effect on the date of Substantial Completion.



- C. Submittal Time: Submit written warranties on request of the Commissioner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- D. Partial Occupancy: Submit properly executed warranties to the Commissioner within fifteen (15) Days of completion of designated portions of the Work that are completed and occupied or used by the City.
- E. Organize the warranty documents into an orderly sequence based on the Project Specification Divisions and Section Numbers.
 - 1. Bind warranties in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES"; name and location of Project; Capitol Budget Project Number (FMS ID); and Contractor's and applicable subcontractor's name and address.
 - 3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation.
 - 4. Provide a typed description of each product or installation being warranted, including the name of the product, and the name, address, and telephone number of the installer.
- F. When warranted materials and/or equipment require operation and maintenance manuals, provide additional copies of each required warranty in each required manual. Refer to Section 01 78 39 CONTRACT RECORD DOCUMENTS, for requirements of operation and maintenance manuals.

PART II – PRODUCTS

2.1 MATERIALS:

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART III – EXECUTION

3.1 FINAL CLEANING:

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations, as applicable, before requesting inspection for Final Acceptance of the Work for the entire Project or for a portion of the Project:
 - a. Clean Project Site, yard, and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project Site.
 - e. Remove snow and ice to provide safe access to building.



- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
 - t. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests, as required in Section 01 50 00 TEMPORARY FACILITIES, SERVICES AND CONTROLS. Prepare and submit a pest control report to the Commissioner.
- D. Comply with all applicable safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on City's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project Site and dispose of lawfully.

END OF SECTION 01 77 00



SECTION 01 77 00

ATTACHMENT 'A'

The following list is a general sample of Substantial Completion requirements, including, but not limited to:

1. Prepare and submit a list to the Resident Engineer of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
2. Obtain and submit any necessary releases enabling the City unrestricted use of the Project and access to services and utilities.
3. Regulatory Approvals: Submit all required documentation from applicable governing authorities, including, but not limited to, the New York City Department of Buildings (DOB); Department of Transportation (DOT); Department of Environmental Protection (DEP); Fire Department (FDNY); etc. Documentation includes, but is not limited to, the following:
 - a. Building permits, applications and sign-offs;
 - b. Permits and sign-off for construction fences; sidewalk bridges; scaffolds, cranes and derricks; utilities; etc.;
 - c. Certificates of inspections and sign-offs;
 - d. Required certificates and use permits; and
 - e. Certificate of Occupancy (C.O.), Temporary Certificate of Occupancy (T.C.O.) or Letter of Completion as applicable.
4. Submit specific warranties required by the Specifications, final certifications, and similar documents.
5. Prepare and submit Contract Documents as described in Section 01 78 39, CONTRACT RECORD DOCUMENTS, including but not limited to:
 - a. Approved documentation from governing authorities;
 - b. As-built record drawings and Specifications; product data; operation and maintenance manuals;
 - c. Final Completion construction photographs;
 - d. Damage or settlement surveys;
 - e. Final property surveys; and
 - f. Similar final record information.
 - g. The Resident Engineer will review the submission and provide appropriate comments. If comments are significant, the initial submission will be returned to the Contractor for correction and re-submission incorporating the comments prior to the Final Inspection.
6. Record Waste Management Progress Report: Submit Construction & Demolition (C&D) Waste Management logs, with legible copies of weight tickets and receipts required in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
7. If applicable submit LEED letter template in accordance with the requirements of Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.



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8. Schedule applicable demonstration and orientation required in other sections of the Project Specifications and as described in Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.
9. Deliver tools and similar items to location designated by Resident Engineer. Label with manufacturer's name and model number where applicable.
10. Make final changeover of permanent locks and deliver keys to the Resident Engineer. Advise Commissioner of changeover in security provisions.
11. Complete startup testing of systems as applicable.
12. Submit approved test/adjust/balance records.
13. Terminate and remove temporary facilities from Project Site, along with mockups, construction tools, and similar elements as directed by the Resident Engineer.
14. If applicable, complete Commissioning requirements as defined in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and/ or Section 01 91 15 BUILDING ENCLOSURE COMMISSIONING REQUIREMENTS.
15. Complete final cleaning requirements, including touchup painting.
16. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.



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**SECTION 01 78 39
CONTRACT RECORD DOCUMENTS**

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes administrative and general procedural requirements for Contract Record Documents, including:
1. Contract Record Drawings
 2. Record Specifications, Addenda and Change Orders
 3. Record Product Data
 4. Record Sample Submittal
 5. Construction Record Photographs
 6. Operating and Maintenance Manuals
 7. Final Site Survey
 8. Demonstration and Orientation DVD
 9. Guarantees and Warranties
 10. Waste Disposal Documentation
 11. LEED Materials and Matrix
 12. Miscellaneous Record Submittals
- B. The Department of Design and Construction (DDC), at the start of construction (kick-off meeting), will furnish to the Contractor, at no cost, a complete set of Contract Record Drawings (PDF set) pertaining to the Work to be performed under the Contract. It is the responsibility of the Contractor to modify the Contract Drawings to indicate all changes and corrections, if any, occurring in the Work as actually installed. The Contractor is required to furnish all other drawings, if necessary, such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all Work in detail as actually completed. All professional seals must be blocked out. Title box complete with Project title and Design Consultants' names will remain.
- C. Maintenance of Documents and Samples: The Contractor must maintain, during the progress of the Work, an accurate record of the Work as actually installed, on Contract Record Drawings (PDF set). Store Contract Record Documents and samples in the field office apart from the Contract Documents used for construction. Do not use Contract Record Documents for construction purposes. Maintain Contract Record Documents in good order and in a clean, dry, legible condition. Make documents and samples available at all times for the Resident Engineer's inspections.
1. The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed Work, so that the Contract Record Drawings contain this information in exact detail and location. Contract Record Drawings must also show all connections, valves, gates, switches, cut-outs and similar operating equipment.



2. For projects designated to achieve a Leadership in Energy and Environmental Design (LEED) rating, the Contractor will receive a copy of the Project’s LEED scorecard for the purpose of monitoring compliance with the target objectives and to facilitate coordination with the LEED Consultant. The Contractor will receive periodic updates of this scorecard and is required to submit the final version of the Scorecard at Substantial Completion with other Project Record Documents.

1.3 RELATED SECTIONS: include without limitation the following:

- | | | |
|----|------------------|-------------------------------------|
| A. | Section 01 10 00 | SUMMARY |
| B. | Section 01 32 00 | CONSTRUCTION PROGRESS DOCUMENTATION |
| C. | Section 01 32 33 | PHOTOGRAPHIC DOCUMENTATION |
| D. | Section 01 33 00 | SUBMITTAL PROCEDURES |
| E. | Section 01 77 00 | PROJECT CLOSEOUT PROCEDURES |

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Commissioning Authority / Commissioning Agent (CxA)	The entity responsible for providing commissioning services for the Project. The entity serving as the CxA may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
LEED Consultant	The entity responsible for providing LEED sustainability services for the Project. The entity serving as the LEED Consultant may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

- A. As-Built Contract Record Drawings: The Contractor must comply with the following:
 1. Progress Submission: As directed by the Resident Engineer, submit progress as-built Contract Record Drawings at the fifty percent (50%) construction completion stage.
 2. Final Submission: Before Substantial Completion payment, the Contractor must furnish to the Commissioner one (1) complete set of marked-up as-built Contract Record Drawings, in PDF indicating all of the Work and locations as actually installed.
 3. As-built Contract Record Drawings must be of the same size as that of the Contract Drawings, with a one (1) inch margin on three (3) sides and a two (2) inch margin on the left side for binding.
 4. Each as-built Contract Record Drawing must bear the legend "AS-BUILT CONTRACT RECORD DRAWING" in heavy block lettering, one half (1/2) inch high, and contain the following data:



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AS-BUILT CONTRACT RECORD DRAWING

Contractor's Name _____
 Contractor's Address _____
 Subcontractor's Name (where applicable) _____
 Subcontractor's Address _____
 Made by: _____ Date _____
 Checked by: _____ Date _____

Commissioner's Representatives
 (Resident Engineer) DDC
 (Plumbing Inspector) DDC
 (Heating & Ventilating Inspector) DDC
 (Electrical Inspector) DDC

5. Contract Record Drawing Title Sheet: The Contractor must prepare a title sheet, the same size as the Contract Record Drawings, which must contain the following:
 - a. Heading:
 - The City of New York
 - Department of Design and Construction
 - Division of Public Buildings
 - b. Capital Budget Project Number (FMS ID)
 - c. Name and Location of Project
 - d. Contractor's Name and Address
 - e. Subcontractor's Name and Address (where applicable)
 - f. Record of changes (a caption description of work affected, and the date and number of change order or other authorization)
 - g. List of Record Drawings
- B. Record Specifications, Addenda and Change Order: Submit to the Commissioner two (2) copies each of marked-up Record Specifications, Addenda and change orders.
- C. Record Product Data: Submit to the Commissioner two (2) sets of Record Product Data.
- D. Record Construction Photographs: Submit to the Commissioner final as-built construction photographs and digital files of the completed Work as described in Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.
- E. Operating and Maintenance Manuals:
 1. Submit three (3) copies each of preliminary manuals to the Resident Engineer for review and approval. The Contractor must make such corrections, changes and/or additions to the manual until deemed satisfactory by the Resident Engineer. Deliver three (3) copies of the final approved manuals to the Resident Engineer for distribution.
 2. Commissioning: Comply with the requirements of Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE, as well as the requirements set forth in sections of the Project Specifications, for projects designated for commissioning. Submit four (4) copies each of data designated to be included in the commissioning operation and maintenance manual to the Resident Engineer. The Resident Engineer will forward such data to the Commissioning Authority/Agent (CxA) for review and comment. The Contractor must make such corrections, changes and/or additions to the data until deemed satisfactory and deliver four (4) copies of the final data to the Resident Engineer for use by the CxA to prepare the commissioning operation and maintenance manual.



- a. Non-Commissioning Data: All remaining data not designated for commissioning and required as part of maintenance and operation manual must be prepared and assembled in accordance with the requirements of this section for operating and maintenance manuals.
- F. Final Site Survey: Submit Final Site survey as described in Section 01 73 00, EXECUTION, in quantities requested by the Commissioner, signed and sealed by a Land Surveyor licensed in the State of New York.
- G. Guarantees and Warranties.
- H. Waste Disposal Documents and Miscellaneous Record Documents.

PART II – PRODUCTS

2.1 CONTRACT RECORD DRAWINGS:

- A. Record Prints: The Contractor must maintain one (1) set of blue- or black-line white prints as applicable of the Contract Record Drawings and Shop Drawings. If applicable, the Contract Record Drawings and Shop Drawings must incorporate the arrangement of the Work based on the accepted master coordination drawing(s) as described in Section 01 33 00, SUBMITTAL PROCEDURES.
 - 1. Preparation: The Contractor must mark record drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Change Orders: All changes from Contract Drawings must be distinctly encircled and identified by change order number correlating to changes listed on the "Title Sheet." The Contractor must show within the encircled areas the work as actually installed.
- B. Content: Types of items requiring marking include, but are not limited to, the following:
 - 1. Dimensional changes to Contract Record Drawings;
 - 2. Revisions to details shown on Contract Record Drawings;
 - 3. Depths of foundations below first floor;
 - 4. Locations and depths of underground utilities;
 - 5. Revisions to routing of piping and conduits;
 - 6. Revisions to electrical circuitry;
 - 7. Actual equipment locations;
 - 8. Duct size and routing;
 - 9. Locations of concealed internal utilities;
 - 10. Changes made by change order;
 - 11. Changes made following Commissioner's written orders;
 - 12. Details not on the original Contract Drawings;
 - 13. Field records for variable and concealed conditions; and
 - 14. Record information on the Work that is shown only schematically.
- C. Progress Record Prints: As directed by the Resident Engineer, at fifty percent (50%) construction completion, review marked-up Record Prints with the Resident Engineer and the Design Consultant. When directed by the Resident Engineer, transfer progress mark-ups to a PDF set and submit to the Resident Engineer.



- D. Final Contract Record Prints: Immediately before final inspection for the Certificate of Substantial Completion, review marked-up record prints with the Resident Engineer and the Design Consultant. When authorized, complete mark-up of a full set of corrected PDF prints of the Contract Drawings.
1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 2. Refer instances of uncertainty to Resident Engineer for resolution.
 3. Submit the as-built Contract Record Drawings and Shop Drawings for use as record prints as described in Sub-Section 1.5.

2.2 RECORD SPECIFICATIONS, ADDENDA AND CHANGE ORDERS:

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, Addenda, and Contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record product data has been submitted in operation and maintenance manuals instead of submitted as record product data.
 5. Note related change orders and Contract Record Drawings where applicable.
 6. Upon completion of mark-up, submit two (2) complete copies of the marked-up record Specifications to the Commissioner.

2.3 RECORD PRODUCT DATA:

- A. Preparation: Mark product data to indicate the actual product installation where installation varies substantially from that indicated in product data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project Site and changes in manufacturer's written instructions for installation.
 3. If possible, a change order proposal should include resubmitting updated product data. This eliminates the need to mark up the previous submittal.
 4. Note related change orders and Contract Record Drawings where applicable.
 5. Upon completion of mark-up, submit to the Commissioner two (2) sets of the marked-up record product data.
 6. Where record product data is required as part of maintenance manuals, submit marked-up product data as an insert in the manual instead of submittal as record product data.

2.4 RECORD SAMPLE SUBMITTAL:

- A. Prior to the date of Substantial Completion, the Contractor must meet with the Resident Engineer at the Site to determine which of the samples maintained during the construction period must be transmitted to the Commissioner for record purposes.



- B. Comply with the Resident Engineer's instructions for packaging, identification marking, and delivery to DDC. Dispose of other samples as specified for disposal of surplus and waste material.

2.5 CONSTRUCTION RECORD PHOTOGRAPHS:

- A. The Contractor must submit the final completion construction photographs, in compliance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.

2.6 OPERATING AND MAINTENANCE MANUALS:

- A. The Contractor must provide preliminary and final versions of operating and maintenance manuals required for those systems, equipment, and materials listed in other Sections of the Project Specifications.
- B. Format: Prepare and assemble operation and maintenance manuals in heavy-duty, 3-ring, hardback loose leaf binders in the form of an instructional manual. All binders for each discipline must be the same color. When multiple binders are used, correlate data into related consistent groupings. Binder front must contain permanently attached labels displaying the following:
 - 1. Heading:
The City of New York
Department of Design and Construction
Division of Public Buildings
 - 2. Capital Budget Project Number (FMS ID)
 - 3. Name and Location of Project
 - 4. Contractor's Name and Address
 - 5. Subcontractor's Name and Address (where applicable)
 - 6. Dates of the Work covered by the contents of the Project Manual.
 - 7. Binder spine must display Project Number (FMS ID) and date of completion.
- C. Organization: Include a section in the directory for each of the following:
 - 1. List of documents
 - 2. List of systems
 - 3. List of equipment
 - 4. Table of contents
- D. Each manual must contain the following materials, in the order listed:
 - 1. Title page
 - 2. Table of contents
 - 3. Manual contents
- E. Arrange contents alphabetically by system, subsystem, and equipment. Cross-reference Specification Section numbers. Provide tabbed flyleaf for each separate product, equipment and/or system/subsystem with typed description of product and major component parts of equipment.
- F. Safety warnings or cautions must be visibly highlighted within each maintenance procedure. Use of such highlights must be limited to only critical items and must not be used in an excessive manner which would reduce their effectiveness.
- G. For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts. Vendors and supplier listings are to include names, addresses and telephone numbers, including nearest field service telephone numbers.
- H. Where contents of the manual include any manufacturer's catalog pages, clearly indicate the precise items and options included in the installation and delete all manufacturers' data regarding products not included in the installation.



- I. All material within manuals must be new. Copies used for prior submittals or used in construction must not be used.
- J. Submit preliminary and final manual editions to the Commissioner according to the approved progress schedule.
- K. Manuals must present all technical material to the greatest extent possible, with respect to text, tabular matter and illustrations. Illustrations must preferably consist of line drawings. All applicable drawings must be included. If available, color photograph prints may be included.
- L. Preliminary manual editions must be as technically complete as the final manual edition. All illustrations must be in final forms.
- M. Final manual editions must be technically accurate and complete and must represent all “as-built” systems, pieces of equipment, or materials, which have been accepted by the Commissioner. All illustrations, text and tabular material must be in final form. All shop drawings must be included as specified in individual Specification Sections.
- N. Building products, applied materials, and finishes: Include product data, with catalog number, size, composition, and color texture designations. Where applicable, provide information for re-ordering custom manufactured products.
- O. Instructions for care and maintenance: Include manufacturers’ recommendations for cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- P. Moisture protection and weather exposed products: Include product data listing applicable reference standards, chemical compositions, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- Q. Additional requirements: Specified in individual Specification Sections.

2.7 FINAL SITE SURVEY

- A. The Contractor must submit the final certification and final survey in compliance with Section 01 73 00 EXECUTION.

2.8 DEMONSTRATION AND ORIENTATION DVD:

- A. The Contractor must submit a final version of applicable demonstration and training electronic recordings in compliance with Section 01 79 00 DEMONSTRATION AND OWNER’S PRE-ACCEPTANCE ORIENTATION.

2.9 GUARANTEES AND WARRANTIES:

- B. SCHEDULE B: Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum.
- C. FORM: For all guaranty requirements set forth in Schedule B, the Contractor must provide a written guaranty, in the form set forth herein.
- D. Submit fully executed and signed manufacturers’ warranties as listed in the Project Specifications and outlined in Schedule B of the Addendum. Refer to Section 01 77 00, CLOSEOUT PROCEDURES for submittal requirements.



GUARANTY

DDC PROJECT # _____

PROJECT DESCRIPTION _____

CONTRACT # _____

SPECIFICATION SECTION # AND TITLE _____

GUARANTY TO BE IN EFFECT FROM _____

TO _____

The Contractor hereby guarantees that the Work specified under the above section of the aforesaid Contract will be free from defects of material and/or workmanship, for the period indicated above.

The Contractor also guarantees that it will promptly repair, restore, rebuild or replace whichever may be deemed necessary by the City, any or all defective material or workmanship of the aforementioned section, that may appear within the guaranty period and any finished Work to which damage may occur because of such defects, to the satisfaction of the City and without any cost or expense to the City.

The Contractor hereby agrees to pay to the City the cost of the repairs or replacements should the City make the same because of the failure of the Contractor to do so.

Contractor: _____

By: _____
Signature of Partner or Corporate Officer

Print Name: _____

Subscribed and sworn to before me this
day of _____, year _____

Notary Public



2.10 WASTE DISPOSAL DOCUMENTATION:

- A. Certify and deliver to the Commissioner all documentation including reports, receipts, certificates, records etc. for the collection, handling, storage, classification, testing, transportation, recycling and/or disposal of all Non-Hazardous Construction Waste as required by Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, and Hazardous Waste as required by other Project Specification Sections. Certify compliance with all applicable governing laws, codes, rules and regulations.

2.11 MISCELLANEOUS RECORD DOCUMENTS:

- A. Refer to other Project Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or otherwise organized to allow for use and reference.
- B. Submit three (3) copies of each document to the Commissioner or as otherwise directed by the Commissioner.

PART III – EXECUTION

3.1 RECORDING AND MAINTENANCE:

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Contract Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of the Project.
- B. Maintenance of Record Documents and Samples: Store Contract Record Documents and samples in the field office apart from the Contract Documents used for construction. Do not use Contract Record Documents for construction purposes. Maintain Contract Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to the Contract Record Documents for the Resident Engineer's reference during normal working hours.

END OF SECTION 01 78 39



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**SECTION 01 79 00
DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 79 00

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes administrative and procedural requirements, when set forth in sections of the Project Specifications, for instructing the facility's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Owner's pre-acceptance orientation in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and orientation video recordings.
- B. The Contractor must provide the services of orientation specialists from the Contractor's equipment manufacturers. The specialists must be experienced in the type of equipment to be demonstrated.
- C. Separate orientation sessions must be conducted for mechanical operations and maintenance personnel and for electronic and electrical maintenance personnel.
- D. Commissioning: Refer to the Addendum to identify whether this project is to be commissioned. For commissioned projects, the Contractor must provide demonstration and orientation as described in this section and cooperate with the Commissioning Authority/Agent (CxA) to implement commissioning requirements as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 BUILDING ENCLOSURE COMMISSIONING REQUIREMENTS.

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 77 00 CLOSEOUT PROCEDURES
- D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- E. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
- F. Section 01 91 15 BUILDING ENCLOSURE COMMISSIONING REQUIREMENTS
- G. Specific requirements for demonstration and orientation indicated in other sections of the Project Specifications.



1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Commissioning Authority / Commissioning Agent (CxA)	The entity responsible for providing commissioning services for the Project. The entity serving as the CxA may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

- A. Instruction Program: Submit three (3) copies of an outline of the instructional program for demonstration and orientation, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each orientation module to the Commissioner for approval no less than thirty (30) Days prior to the date the proposed orientation is to take place. Include learning objectives and outline for each orientation module.
 - 1. At completion of orientation, submit three (3) complete training manual(s) and three (3) applicable video recording(s) to the Commissioner for the facility's and City's use.
- B. Qualification Data: For facilitator, instructor and videographer.
- C. Attendance Record: For each orientation module, submit a list of participants and length of instruction time.
- D. Evaluations: For each participant and for each orientation module, submit results and documentation of performance-based test.
- E. Submit all final orientation materials to the Resident Engineer a minimum of fourteen (14) Days prior to the scheduled orientation.
- F. Demonstration and Orientation Recordings:
 - 1. All Projects:
 - a. The Contractor must submit to the Commissioner three (3) copies of demonstration and orientation video recordings within seven (7) Days of end of each orientation module.
 - b. Identification: On each copy, provide an applied label with the following information:
 - 1) Project Contract I.D. Number
 - 2) Project Contract Name
 - 3) Name of Contractor
 - 4) Name of Subcontractor as applicable
 - 5) Name of Design Consultant
 - 6) Name of Construction Manager as applicable
 - 7) Date recorded



- 8) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - 9) Table of Contents including list of systems covered.
- c. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding DVD recording. Include name of Project and date of recording on each page.
 - d. Commissioned Projects: The Contractor must submit one (1) additional copy of the demonstration and orientation video recording to the CxA through the Resident Engineer who will include the approved recording in the commissioning report.

1.6 QUALITY ASSURANCE:

- A. Facilitator Qualifications: A firm or individual experienced in orientation or educating maintenance personnel in an orientation program similar in content and extent to that indicated for this Project.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 QUALITY REQUIREMENTS, experienced in operation and maintenance procedures and orientation.
- C. Videographer Qualifications: A professional videographer who has experience with orientation and construction projects.
- D. Pre-Instruction Conference: Schedule with the Resident Engineer a conference at Project Site in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to demonstration and orientation including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.7 COORDINATION:

- A. Coordinate instruction schedule with the Resident Engineer and facility's operations. Adjust schedule as required to minimize disrupting facility's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of orientation modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the Commissioner.

PART II – PRODUCTS

2.1 INSTRUCTION PROGRAM:

- A. Program Structure: Develop an instruction program that includes individual orientation modules for each system and equipment not part of a system, as specified and required by individual Specification Sections.



- B. Orientation Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. For basis of system design, operational requirements, and criteria, include the following:
 - a. System, subsystem, and equipment descriptions;
 - b. Performance and design criteria if Contractor is delegated design responsibility;
 - c. Operating standards;
 - d. Regulatory requirements;
 - e. Equipment function including auxiliary equipment and systems;
 - f. Operating characteristics;
 - g. Limiting conditions; and
 - h. Performance curves.
 2. For documentation, review the following items in detail:
 - a. Emergency manuals;
 - b. Operations manuals;
 - c. Maintenance manuals;
 - d. Project Record Documents;
 - e. Identification systems; and
 - f. Warranties.
 3. For emergencies, include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages;
 - b. Instructions on stopping;
 - c. Shutdown instructions for each type of emergency;
 - d. Operating instructions for conditions outside of normal operating limits;
 - e. Sequences for electric or electronic systems; and
 - f. Special operating instructions and procedures.
 4. For operations, include the following, as applicable:
 - a. Startup procedures;
 - b. Equipment or system break-in procedures;
 - c. Routine and normal operating instructions;
 - d. Regulation and control procedures;
 - e. Control sequences;
 - f. Safety procedures;
 - g. Instructions on stopping;
 - h. Normal shutdown instructions;
 - i. Operating procedures for emergencies;
 - j. Operating procedures for system, subsystem, or equipment failure;
 - k. Seasonal and weekend operating instructions;
 - l. Required sequences for electric or electronic systems; and
 - m. Special operating instructions and procedures.
 5. For adjustments, include the following:
 - a. Alignments;
 - b. Checking adjustments;
 - c. Noise and vibration adjustments; and
 - d. Economy and efficiency adjustments.
 6. For troubleshooting, include the following:



- a. Diagnostic instructions; and
 - b. Test and inspection procedures.
7. For maintenance, include the following:
- a. Inspection procedures;
 - b. Types of cleaning agents to be used and methods of cleaning;
 - c. List of cleaning agents and methods of cleaning detrimental to product;
 - d. Procedures for routine cleaning;
 - e. Procedures for preventive maintenance;
 - f. Procedures for routine maintenance;
 - g. Instruction on use of special tools; and
 - h. Housekeeping practices.
8. For repairs, include the following:
- a. Diagnosis instructions;
 - b. Repair instructions;
 - c. Disassembly, component removal, repair, and replacement; and reassembly instructions;
 - d. Instructions for identifying parts and components; and
 - e. Review of spare parts needed for operation and maintenance.

PART III – EXECUTION

3.1 INSTRUCTION:

- A. Facilitator: Engage a qualified facilitator to prepare the instruction program and orientation modules, to coordinate instructors, and to coordinate between Contractor and the Resident Engineer for the number of participants, instruction times, and location.
- B. The Contractor must engage qualified instructors to instruct the facility's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Schedule instruction with the Resident Engineer at mutually agreed upon times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 1. Schedule orientation with the Resident Engineer with at least fourteen (14) Days advance notice.
- D. Evaluation: At the conclusion of each orientation module, assess and document each participant's mastery of module(s) by use of an oral or written demonstration performance-based test.
- E. Cleanup: Collect and remove used and leftover educational materials from Project Site. Remove instructional equipment. Restore systems and equipment to condition existing before initial orientation use.

3.2 DEMONSTRATION AND ORIENTATION VIDEO RECORDINGS:

- A. All projects:
 1. The Contractor must engage a qualified commercial videographer to video record demonstration and orientation sessions. Record each orientation module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 2. At the beginning of each orientation module, record each chart containing learning objective and lesson outline.
 3. All recordings must be close-captioned.
 4. Recording Format: Provide high-quality video recording on USB drive or other electronic media as requested by the Commissioner.



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5. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and orientation. Display continuous running time.
 6. Narration: Describe scenes on the recording by audio narration by microphone while recording or by dubbing audio narration off-site after. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 7. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from opposite the corresponding narration segment.
- B. Commissioned Projects: Refer to the Addendum to determine if the project is to be commissioned.
1. The Commissioning Authority/Agent (CxA) under separate contract with the City of New York will assess and comment on the adequacy of the orientation instruction sessions by reviewing the orientation and instruction program and agenda provided by the Contractor. The provider of the orientation program will video record the sessions and provide a copy to the CxA for final review and comments. If necessary, Contractor must edit the recording per CxA comments.

END OF SECTION 01 79 00



**SECTION 01 81 13.03
SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.03

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. LEED BUILDING - GENERAL REQUIREMENTS:

The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED™ Green Building rating. Specific project requirements related to this goal are listed in the applicable paragraphs of this section of the General Conditions. The Contractor must ensure that these requirements, as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, will not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. This Section includes:

- 1. Definitions
- 2. LEED Provisions
- 3. LEED Building Submittals
- 4. LEED Building Submittal Requirements
- 5. LEED Action Plan

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
- B. Section 01 81 13.13 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS
- C. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
- D. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
- E. Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.



Agrifiber Products	Means products derived from recovered agricultural waste fiber from sources such as cereal straw, sugarcane bagasse, sunflower husk, walnut shells, coconut husks, and agricultural prunings, processed and mixed with resins to produce panels with characteristics similar to composite wood.
Composite Wood	Means products composed of wood or plant particles or fibers bonded by a synthetic resin or binder to produce panels such as plywood, particleboard, and medium density fiberboard (MDF). Does not include hardboard, structural panels, glued laminated timber, prefabricated wood I-joists, or finger-jointed lumber.
Design Consultant	Means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Forest Stewardship Council (FSC) Certified Wood	Means wood-based materials and products certified in accordance with the Forest Stewardship Council’s principles and criteria.
LEED	Means the Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council.
Rapidly Renewable Materials	Means materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
Regionally Manufactured Materials	Means materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
Regionally Extracted, Harvested, or Recovered Materials	Means materials which are extracted, harvested, or recovered and manufactured within a radius of 500 miles from the Project site.
Recycled Content	Means The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer). Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials. “Pre-consumer” may also be referred to as “post-industrial”.
Solar Reflectance Index (SRI)	A measure of a material’s ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is equal to 0, and a standard white (reflectance 0.80, emittance of 0.90) is equal to 100.



Volatile Organic Compound (VOC)	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.
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1.5 LEED PROVISIONS:

- A. Refer to the Addendum for the LEED rating to be achieved for this project. The provisions to achieve this LEED rating are integrated within the project construction documents and specifications. The Contractor is specifically directed to the “LEED BUILDING Performance Criteria” and “LEED BUILDING Submittals” sections within the contract specification. Additional LEED requirements are met through aspects of the project design, including material and equipment selections, which may not be specifically identified as LEED BUILDING requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.

1.6 LEED BUILDING SUBMITTALS:

- A. Scope: LEED BUILDING submittals are required for all installed materials included in General Construction work. LEED BUILDING Submittals are only required for field-applied adhesives, sealants, paints and coatings included in Plumbing, Mechanical and Electrical work. Submit all required LEED BUILDING submittals in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- B. Applicability: The extent of the LEED BUILDING Submittals varies depending on the specification section. Applicable LEED BUILDING Submittals are listed under the “LEED BUILDING Submittals” heading in each specification section. The detailed requirements for the LEED BUILDING Submittals are defined in Item C below.
- C. Detailed Requirements: Sub-Sections 1.6 C.1 through 1.6 C.3 below defines the information and documents to be provided for each type of LEED BUILDING Submittal as identified in the LEED Submittal Requirements of each specification section:
 - 1. ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM (EBMCF)[GHI]: Information to be supplied for this form (blank sample copy attached at end of this Section to be modified as appropriate to the project) must include some or all of the following items, as identified in the LEED Submittal Requirements of each specification section:
 - a. Cost breakdowns for the materials included in the contractor or sub-contractor’s scope of work. Cost reporting must include itemized material costs (excluding the contractor’s labor, equipment, overhead and profit).
 - b. The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
 - 1) For each product with recycled content, also indicate the total recycled content value ($1/2 \times \text{pre-consumer percentage} \times \text{product value} + 1 \times \text{post-consumer percentage} \times \text{product value} = \text{total recycled content value}$).
 - 2) See additional requirements for concrete below.
 - c. Identification (Yes/No) of materials manufactured within 500 miles of the project site AND containing raw materials harvested or extracted within 500 miles of the project site.
 - 1) Indicate the percentage by weight, relative to the total weight of the product that meets these criteria.
 - 2) Indicate the point of harvest/extraction/recovery of regional raw materials, the point of final assembly of regional manufactured products, and the distance from each point to the project site.



- d. Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon, less water.
 - 1) For detailed requirements refer to Section 01 81 13.13 VOC LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS.
 - e. The amount of “Forest Stewardship Council (FSC) Certified” wood products if used in the Project.
 - 1) Record only new FSC-certified wood products. Do not record reclaimed, salvaged, or recycled FSC-certified wood products.
 - 2) Reclaimed, salvaged, or recycled FSC-certified wood may be recorded as post-consumer recycled content.
 - f. The amount of Rapidly Renewable materials if used in the Project.
 - 1) Indicate the type of rapidly renewable material used, and the percentage by weight, relative to the total weight of the product, that consists of rapidly renewable material.
 - g. The percentage (by weight), relative to the total weight of cementitious materials, of supplementary cementitious materials or pozzolans such as fly ash used in each concrete mix used in the Project.
 - 1) For each concrete mix, provide a complete breakdown of all components, by weight and by cost.
 - h. Identification (Yes/No) of composite wood or agrifiber products used in the project that are free of added urea-added formaldehyde resins.
 - i. Identification (Yes/No) of flooring products used in the project that have Carpet and Rug Institute (CRI) Green Label or Green Label Plus certification, or Resilient Floor Covering Institute FloorScore certification.
 - 1) Untreated solid wood flooring, and mineral-based flooring products such as tile, masonry, terrazzo, and cut stone that have no organic-based coatings or sealants, are excluded from this requirement.
 - j. The EBMCF must record the above information only for those materials or products permanently installed in the project. The EBMCF must record VOC content, composite and agrifiber products, and CRI or FloorScore ratings only for those materials or products permanently installed within the weather barrier of the LEED building.
2. EBMCF BACK-UP DOCUMENTATION: These documents are used to validate the information provided on the EBMCF (except cost data). For each material listed on the EBMCF, provide documentation to certify the material’s LEED BUILDING attributes, as applicable:
- a. RECYCLED CONTENT: Provide published product literature or letter of certification on the manufacturer’s letterhead certifying the amounts of post-consumer and/or post-industrial content.
 - b. REGIONAL MANUFACTURING AND REGIONAL RAW MATERIALS (WITHIN 500 MILES): Provide published product literature or letter of certification on the manufacturer’s letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered and the distance in miles from the project site.
 - 1) If only some of the raw materials for a particular product or assembly originate within 500 miles of the project site, provide the percentage (by weight) that these materials comprise in the complete product.



- c. **VOC CONTENT:** Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs./gallon, less water. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.
 - d. **RAPIDLY RENEWABLE MATERIALS:** If used in the project, provide published literature or letter of certification on the manufacturer's letterhead certifying the percentage of each product that is rapidly renewable (by weight).
 3. **PRODUCT CUT SHEETS:** Provide product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.
 4. **CRI GREEN LABEL PLUS CERTIFICATION:** For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.
 5. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS:** For all composite wood, engineered wood and agrifiber products (including plywood, particleboard, and medium density fiberboard), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added urea-formaldehyde resins.
 6. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER LAMINATING ADHESIVES:** For all laminating adhesives used with composite wood, engineered wood and agrifiber products (e.g., adhesives used to laminate wood veneers to an engineered wood substrate), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the adhesive products do not contain urea-formaldehyde.
 7. **FSC-CERTIFIED WOOD:**
 - a. If used in the project, provide chain of custody documents and copies of invoices regarding wood products, including whether or not such wood product is FSC-certified.
 - b. If used in the project, for assemblies, provide the percentage (by cost and by weight) of the assembly that is FSC-certified wood.
 - c. If used in the project, for assemblies, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the percentage that is FSC-certified wood.
 8. **GREEN SEAL COMPLIANCE:** Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:
 - a. Interior Architectural Paints and Coatings: refer to Green Seal standard GS-11 (1st edition, May 1993)
 - b. Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2nd Edition, January 1997)
 - c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1st edition, October 2000)
 9. **HIGH ALBEDO PAVING AND WALKWAY MATERIALS:** For paving and walkway materials made from concrete or brick provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum Solar Reflectance Index (SRI) value of 29. SRI



values will be calculated according to ASTM E 1980. Reflectance will be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance will be measured according to ASTM E 408 or ASTM C 1371.

10. **HIGH ALBEDO ROOFING MATERIALS:** For exposed roofing membranes, pavers, and ballast products, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values:

- a. 78 for low-sloped roofing applications (slope \leq 2:12)
- b. 29 for steep-sloped roofing applications (slope $>$ 2:12)

SRI values will be calculated according to ASTM E 1980. Reflectance will be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance will be measured according to ASTM E 408 or ASTM C 1371.

Vegetated roof surfaces are exempt from the SRI criteria.

11. **LOW MERCURY LAMPS:** For all fluorescent, compact fluorescent, and HID lamps installed in the project, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying:

- a. The mercury content or content range per lamp in milligrams or picograms;
- b. The design light output per lamp (light at 40% of a lamp's useful life) in lumens; and
- c. The rated average life of the lamp in hours.

In addition, provide the total number of each lamp type installed in the project.

12. **FLOORSCORE CERTIFICATION:** For all hard surface flooring, including vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the current FloorScore standard requirements.
13. **CONCRETE:** Provide concrete mix design for each mix, designated by a distinct identifying code or number and signed by a Professional Engineer licensed in the state in which the concrete manufacturer or supplier is located.
14. **INTERIOR LIGHTING FIXTURES:** For each lighting fixture type installed within the building's weather barrier, provide manufacturer's cut sheets indicating the following:
- a. Fixture power in watts.
 - b. Initial lamp lumens.
 - c. Photometric distribution data.
 - d. Dimming capability, in range of percentages.
15. **EXTERIOR LIGHTING FIXTURES:** For each lighting fixture type installed on site, provide manufacturer's cut sheets indicating the following:
- a. Fixture power in watts.
 - b. Initial lamp lumens.
 - c. Photometric distribution data.
 - d. Range of field adjustability, if any.
 - e. Warranty of suitability for exterior use.



16. **ALTERNATIVE TRANSPORTATION:** Provide manufacturer's cut sheets and/or shop drawings for the following items installed on site:
 - a. Bike racks, including total number of bicycle slots provided.
 - b. Signage indicating parking spaces reserved for electric or low-emitting vehicles and for carpools/vanpools, including total number of signs.
17. **WATER CONSERVING FIXTURES:** For all water consuming plumbing fixtures and fittings, provide manufacturer's cut sheets showing maximum flow rates and/or flush rates.
18. **ENERGY SAVING APPLIANCES:** Provide manufacturer's cut sheets and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the product's rating under the U.S. EPA/DOE Energy Star program, for all of the following:
 - a. Appliances (i.e., refrigerators, dishwashers, microwave ovens, televisions, clothes washers, clothes dryers, chilled water dispensers).
 - b. Office equipment (i.e., copy machines, fax machines, plotters/printers, scanners, binding and publishing equipment).
 - c. Electronics (i.e., servers, desktop computers, computer monitor displays, laptop computers, network equipment).
 - d. Commercial food service equipment
19. **GLAZING:** For glazing in any windows, doors, storefront and window wall systems, curtainwall systems, skylights, and partitions, provide manufacturer's cut sheets indicating the following:
 - a. Glazed area.
 - b. Visible light transmittance.
 - c. Solar heat gain coefficient.
 - d. Fenestration assembly u-factor.
20. **VENTILATION:** Provide manufacturer's cut sheets for the following:
 - a. Carbon dioxide monitoring systems, if any, installed to measure outside air delivery.
 - b. Air filters: for detailed requirements refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS.
21. **REFRIGERATION:** For all refrigeration equipment, provide manufacturer's cut sheets indicating the following:
 - a. Equipment type.
 - b. Equipment life. Default values specified by the 2007 ASHRAE Applications Handbook will be used unless otherwise demonstrated by the manufacturer's guarantee and an equivalent long-term service contract.
 - c. Refrigerant type.
 - d. Refrigerant charge in pounds of refrigerant per ton of gross cooling capacity.
 - e. Tested refrigerant leakage rate, in percent per year. A default rate of 2% will be used unless otherwise demonstrated by test data.
 - f. Tested end-of-life refrigerant loss, in percent. A default rate of 10% will be used unless otherwise demonstrated by test data.



1.7 LEED BUILDING SUBMITTAL REQUIREMENTS:

- A. The LEED BUILDING Submittal information must be assembled into one package per contract specification section(s) (or per subcontractor), and submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Incomplete or inaccurate LEED BUILDING submittals may be used as the basis for the rejection of products or assemblies. Incomplete or inaccurate LEED BUILDING Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.8 LEED ACTION PLANS:

- A. Construction Waste Management Plan- Refer to Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for detailed submittal requirements.
- B. Construction IAQ Management Plan- Refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS for detailed submittal requirements.
- C. Erosion and Sedimentation Control Plan:
 - 1. The Plan must be in accordance with the New York State Department of Environmental Conservation (NYSDEC) or the 2003 EPA Construction General Permit, whichever is more stringent.
 - 2. The Plan must be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
 - 3. Detailed requirements: ESC Plan
 - a. Include the Stormwater Pollution Prevention Plan, if required.
 - b. Identify the party responsible for Plan monitoring and documentation. The party must be regularly on site.
 - c. Describe all site work that will be implemented on the project.
 - d. Provide site plan with location of ESC measures, including, but not limited to, stormwater quantity controls, stormwater quality controls, stabilized construction entrances, washdown areas, and inlet/catch basin protection.
 - e. Describe the inspection and maintenance of the ESC measures. Provide a construction schedule indicating weekly site review.
 - f. Describe reporting and documentation measures.
 - 4. Detailed requirements: ESC Measures
 - 5. Submittal requirements: ESC Tracking Log
 - a. Note date of major rain events, describe damage, describe any repairs or maintenance performed, and note responsible party.
 - b. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party.
 - c. Submit monthly.
 - 6. Implementation
 - a. The Contractor must implement the ESC Plan, coordinate the Plan with all affected trades, and designate one individual as the Erosion and Sedimentation Control Representative, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation.



- b. The Contractor must be responsible for the provision, maintenance, and repair of all ESC measures.
- c. Demonstration. The Contractor must provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.
- d. Meetings. Urgent or ongoing ESC issues will be discussed at weekly on-site job meetings.

1.9 QUALITY ASSURANCE:

- A. The Contractor must implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and designate one individual as the Sustainable Construction Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of LEED activities with the Commissioner on a regular basis, and for assembling the required LEED documentation.
- B. Responsibilities of Contractor's Subcontractors: The Contractor is responsible for his/her subcontractors complying with the LEED Action Plans and for providing required LEED documentation as required for the project.
- C. Distribution and Compilation: The Contractor is responsible for distributing the EBMCF and any other forms or templates required for the subcontractors to record LEED documentation. The Contractor also be responsible for collecting and compiling EBMCF information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.
- D. Meetings: Sustainable design and construction issues must be discussed at the following meetings:
 - 1. Demolition kick-off meeting
 - 2. Construction kick-off meeting
 - 3. Construction kick-off meeting for LEED (independent meeting)
 - 4. Weekly job-site progress and coordination meetings
 - 5. Closeout meeting

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.03



ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM

Contractor Name: _____
Contractor Contact: _____
Telephone Number: _____

Project Name: _____
Project I.D.: _____

Product/Manufacturer	Material Cost ¹	Recycled Content			Regional ⁴			Rapidly Renewable ⁷		VOC content ⁸		Flooring ⁹	Wood	
		Pre-Consumer (% by wt) ²	Post-Consumer (% by wt) ³	Total % (½ Pre + Post)	Location & Distance to Extraction ⁵	Location & Distance to Manufacture ⁶	Extracted & Manuf. (% by wt)	Material	% by wt	*VOC content listed	*VOC content allowed	*Green Label or FloorScore	*Added urea formaldehyde (Yes/No) ¹⁰	FSC Certified ¹¹ (% by wt)

¹ **Material Cost:** As it appears on the manufacturer's or distributor's invoice to the contractor or subcontractor. Does not include labor or equipment costs associated with installation.

² **Pre-Consumer Recycled Content:** Industrial/manufacturing waste material (e.g., fly-ash and synthetic gypsum, both waste products from coal burning electricity plants) diverted from landfill and incorporated into a finished product. Scrap raw materials that can be reused in the same manufacturing process from which they are recovered are not considered Pre-Consumer Recycled Content.

³ **Post-Consumer Recycled Content:** Material or product that has served its intended consumer use (e.g., an empty plastic bottle) and has been diverted from landfill and incorporated into a finished product.

⁴ **Regional:** Refers to a material/product that is BOTH extracted AND manufactured within 500 miles of the Project site. Record this information ONLY for materials/products meeting BOTH of these criteria.

⁵ **Extraction:** Refers to the location from which the raw resources used in a building product are extracted, harvested, or recovered.

⁶ **Manufacture:** Refers to the location of the final assembly of components into a building product that is furnished and installed by the Contractor.

⁷ **Rapidly Renewable:** Refers to materials/products derived from agricultural products that are typically harvested within a ten-year or shorter cycle.

⁸ **VOC Content:** The quantity of volatile organic compounds contained in adhesives, sealants, paints and architectural coatings. Reported in grams/liter or lbs/gallon, less water.

⁹ **Flooring:** For carpet, indicate Carpet and Rug Institute (CRI) Green Label Plus certification. For carpet cushion, indicate CRI Green Label certification. For all flooring except unfinished/untreated wood and mineral-based flooring (tile, masonry, terrazzo, cut stone) without organic-based coatings or sealants, indicate Resilient Floor Covering Institute FloorScore rating. VOC limits for adhesives, sealants, etc. still apply.

¹⁰ **Added Urea Formaldehyde:** Applies to composite wood and agrifiber products only (plywood, particleboard, MDF, OSB, wheatboard, strawboard). Resins or binders with added urea formaldehyde are prohibited.

¹¹ **FSC Certified:** Certification from the Forest Stewardship Council. This column is only applicable to wood products.

* Applies only to materials/products installed within the weather barrier.

Contractor Certification:
I, _____ a duly authorized representative of _____ (the Contractor) hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by the Contractor as components of the final building construction. Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Commissioner.

Signature of Authorized Representative: _____ Date: _____



**SECTION 01 81 13.04
SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.04

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. LEED BUILDING - GENERAL REQUIREMENTS:

The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED™ Green Building rating. Specific Project requirements related to this goal are listed in the applicable paragraphs of this section of the General Conditions. The Contractor must ensure that these requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, will not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. This Section includes:

1. Definitions
2. LEED Provisions
3. LEED Building Submittals
4. LEED Building Submittal Requirements
5. LEED Action Plan
6. VOC Requirements for Interior Adhesives and Sealants
7. VOC Requirements for Interior Paints and Coatings
8. Low-Emitting Materials, Flooring
9. Low-Emitting Materials, Composite Wood
10. Low-Emitting Materials, Ceilings, Walls, Thermals and Acoustic Insulation
11. Low-Emitting Materials, Furniture
12. Low-Emitting Materials, Exterior Applied Products
13. Low-Emitting Materials, Additional Low-Emitting Requirements

C. This Section includes requirements for Volatile Organic Compound (VOC) emissions and content in specific materials used within the Project.

D. All sections in the Project Specifications with adhesives, sealant or sealant primer applications, paints, coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products, must follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications regarding adhesives, sealant or sealant applications, paints, coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products, the requirements set forth in this Section will prevail.



1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
- B. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
- C. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
- D. Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Adhesive	Any substance used to bond one surface to another by attachment. Includes adhesive primers and adhesive bonding primers.
Aerosol Adhesive	Any adhesive packaged as an aerosol with a spray mechanism permanently housed in a non-refillable can designed for hand-held application without the need for ancillary equipment
Agrifiber Products	Products derived from recovered agricultural waste fiber from sources such as cereal straw, sugarcane bagasse, sunflower husk, walnut shells, coconut husks and agricultural prunings, processed and mixed with resins to produce panels with characteristics similar to composite wood.
Bio-based materials	Composed in whole or in significant part of biological products, renewable agricultural materials or forestry materials, and must meet the Sustainable Agriculture Network’s Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material.
Building Exterior	A structure’s primary and secondary weatherproofing system, including waterproofing membranes and air- and water-resistant barrier materials, and all building elements outside that system.
Building Interior	Everything inside a structure’s weatherproofing membrane.
Carcinogen	A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer



	(IARC) (Groups 1, 2A, and 2B), the National Toxicology Program (NTP) (Groups 1 and 2), the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the Occupational Safety and Health Administration (OSHA).
Certified Wood	See Forest Stewardship Council (FSC) Certified Wood.
Clear Wood Finish	Clear/semi-transparent coating applied to wood substrates to provide a transparent or translucent solid film.
Coating	Liquid, liquefiable or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer; and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics; and is intended for on-site application to interior or exterior surfaces of buildings. Does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings or paint sold in aerosol cans.
Composite Wood	Products composed of wood or plant particles or fibers bonded by a synthetic resin or binder to produce panels such as plywood, particleboard, and medium density fiberboard (MDF). Does not include hardboard, structural panels, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber.
Cradle-to-Gate Assessment	Analysis of a product’s partial life cycle, from resource extraction to the factory gate, before it is transported for distribution and sale.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.



Enclosure	The exterior plus semi-exterior portions of the building. Exterior consists of the elements of a building that separate conditioned spaces from the outside (i.e., the wall assembly). Semi-exterior consists of the elements of a building that separate conditioned space from unconditioned space or that encloses semi-heated space through which thermal energy may be transferred to or from the exterior or conditioned or unconditioned spaces (e.g., attic, crawl space, basement).
Environmental Product Declaration (EPD)	A statement that the item meets the environmental requirements of, ISO 14025, 14040 and EN 15804, or ISO 21930 and have at least a cradle-to-gate scope.
Extended Producer Responsibility	A waste management strategy, also known as closed-loop program or product take-back, where the manufacturer's responsibility for a product is extended to the post-consumer stage of the product's life-cycle.
Floor Coating	Opaque coating applied to flooring. Excludes industrial maintenance coatings.
Forest Stewardship Council (FSC) Certified Wood	Wood-based materials and products certified in accordance with the Forest Stewardship Council's principles and criteria.
Hazardous Air Pollutant	Any compound listed by the U.S. EPA in the Clean Air Act Section 112(b)(1) as a hazardous air pollutant.
Inherently Non-Emitting Materials	Products that are inherently non-emitting sources of VOCs, including stone, ceramic, powder-coated metals, plated or anodized metals, lass, concrete, clay brick, unfinished solid wood, untreated solid wood. These materials are considered compliant without VOC testing if they do not include integral organic-based surface coatings, binders or sealants.
Lacquer	Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film.



LEED	The Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council (USGBC).
Life-Cycle Assessment	An evaluation of the environmental effects of a product from cradle to grave, as defined by ISO 14040-2006 and ISO 14044-2006.
Mutagen	A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).
Ozone-Depleting Compounds	A compound with an ozone-depletion potential greater than 0.1 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
Paint	<p>A pigmented coating. For the purposes of this specification, paint primers are considered to be paints.</p> <p>A. Flat Coating or Paint: Has a gloss of less than 15 (using an 85-degree meter) or less than 5 (using a 60-degree meter).</p> <p>B. Non-Flat Coating or Paint: Has a gloss of greater than or equal to 15 (using an 85-degree meter) or greater than or equal to 5 (using a 60-degree meter).</p> <p>C. Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree meter).</p> <p>Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing the corrosion of ferrous metal substrates.</p>
Permanently Installed Building Product	See Product.
Primer	Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the



	substrate; or to provide a smooth surface for application of a subsequent coating.
Product	An item that arrives on the Project site either as a finished element ready for installation or as a component to another item assembled on-site. The product unit is defined by the functional requirement for use in the Project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. Similar products within a specification will each contribute as a separate product.
Product-Specific Declaration	Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle-to-gate scope.
Recycled Content	<p>The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer). Recycled content claims for products must conform to the definition in ISO 14021-1999, Environmental Labels and Declarations, Self-Declared Environmental Claims (Type II Environmental Labeling).</p> <p>Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.</p> <p>Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.</p> <p>“Pre-consumer” may also be referred to as “post-industrial”.</p>



Regionally Manufactured Materials	Materials that are manufactured, distributed and purchased within a radius of 100 miles from the Project location. Manufacturing refers to all points of manufacture for an assembly of components.
Regionally Extracted, Harvested, or Recovered Materials	Materials which are extracted, harvested or recovered, manufactured, distributed and purchased within a radius of 100 miles from the Project site.
Reproductive Toxin	A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).
Sanding Sealer	Clear/semi-transparent coating formulated to seal bare wood. Can be abraded to create a smooth surface for subsequent coatings. Does not include sanding sealers that are lacquers (see Clear Wood Finish above).
Sealant	Any material with adhesive properties, formulated primarily to fill, seal, or waterproof gaps or joints between surfaces. Includes sealant primers and caulks.
Shellac	Clear or pigmented coating formulated solely with the resinous secretions of the lac beetle, thinned with alcohol and formulated to dry by evaporation without chemical reaction. Excludes floor applications.
Solar Reflectance Index (SRI)	A measure of a material's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is equal to 0, and a standard white (reflectance 0.80, emittance of 0.90) is equal to 100.
Stain	Clear semi-transparent/opaque coating formulated to change the color but not conceal the grain pattern or texture of the substrate.
Varnish	Clear/semi-transparent coating, excluding lacquers and shellacs, formulated to dry by chemical reaction on exposure to air. May contain small amounts of pigment.



Volatile Aromatic Compound	Any hydrocarbon compound containing one or more 6-carbone benzene rings, and having an initial boiling point less than or equal to 280 degrees Celsius measured at standard conditions of temperature and pressure.
Volatile Organic Compound (VOC)	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs. Waterproofing Sealer: A coating that prevents the penetration of water into porous substrates.

1.5 LEED PROVISIONS:

- A. Refer to the Addendum for the LEED rating to be achieved for this Project. The provisions to achieve this LEED rating are integrated within the Project construction documents and specifications. Additional LEED requirements are met through aspects of the Project design, including material and equipment selections, which may not be specifically identified as LEED Building requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.

1.6 LEED BUILDING SUBMITTALS:

- A. Scope: LEED Building Submittals are required for all permanently installed materials included in General Construction work. For Plumbing, Mechanical and Electrical work, LEED Building Submittals are only required for field-applied adhesives, sealants, paints and coatings. Voluntary inclusion of system components such as piping, pipe insulation, ducts, conduits, plumbing fixtures, faucets and lamp housings must be consistently applied to the Project’s LEED credits. Submit all required LEED Building Submittals in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- B. Applicability: The extent of the LEED Building Submittals varies depending on the specification section. Applicable LEED Building Submittals are listed under the “LEED Building Submittals” heading in each specification section. The detailed requirements for the LEED Building Submittals are defined in Sub-Section 1.6 C below.
- C. Detailed Requirements: Sub-Sections 1.6 C.1 through 1.6 C.18 below define the information and documents to be submitted for each type of LEED Building Submittal as identified in the LEED Building Submittals heading in each specification section:
 - 1. LEED v4 Material and Resources (MR) Credits Calculator for Building Product Disclosure and Optimization (Disclosure and Optimization Calculator): With each submittal of a product permanently installed in the Project, the Contractor is responsible for the completion of the



Disclosure and Optimization Calculator, which can be found on USGBC's website. The Contractor must maintain an updated Disclosure and Optimization Calculator for all applicable products throughout the Project duration and submit the updated calculator on a monthly basis.

- a. The Disclosure and Optimization Calculator will record the information outlined in Items b.-c. below for all permanently installed products, the information outlined in Item d. below for all permanently installed concrete mixes, and the information outlined in Items e.-i. below for all permanently installed products that have the content, disclosure or optimization characteristics described herein:
- b. Cost breakdowns for the materials included in the Contractor or subcontractor's scope of work. Cost reporting must include itemized material costs (excluding the Contractor's labor, equipment, overhead and profit).
- c. The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
 - 1) For each product with recycled content, also indicate the total recycled content value ($1/2 \times \text{pre-consumer percentage} \times \text{product value} + 1 \times \text{post-consumer percentage} \times \text{product value} = \text{total recycled content value}$).
 - 2) See additional requirements for concrete in section 1.6.C.1.d below.
- d. The percentage (by weight), relative to the total weight of cementitious materials, of supplementary cementitious materials or pozzolans such as fly ash used in each concrete mix used in the Project.
 - 1) For each concrete mix, submit a complete breakdown of all components, by weight and by cost.
- e. Identification (Yes/No) of materials manufactured, distributed and purchased within 100 miles of the Project site AND containing raw materials harvested or extracted within 100 miles of the Project site, if used in the Project, as well as the following information:
 - 1) Indicate the percentage by weight, relative to the total weight of the product that meets these criteria.
 - 2) Indicate the point of harvest/extraction/recovery of regional raw materials, the point of final assembly of regional manufactured products, and the distance from each point to the Project site.
- f. The percentage (by cost) of "Forest Stewardship Council (FSC) Certified" wood products, if used in the Project.
 - 1) Record all new wood products, indicating which are FSC-certified. Do not record reclaimed, salvaged, or recycled FSC-certified wood products.
 - 2) Reclaimed, salvaged, or recycled FSC-certified wood may be recorded as post-consumer recycled content.
- g. The number or percentage of products with Environmental Product Declarations (EPD), with fractional or multiplied values as indicated below. If a product used in the Project has an EPD Declaration, submit one of the following:
 - 1) EPD:
 - i. Product-Specific Declaration: Valued as one quarter (1/4) of a product
 - ii. Industry-Wide (Generic) EPD: Valued as one half (1/2) of a product
 - iii. Product-Specific Type III EPD: Valued as one whole product
 - 2) Documentation of third-party certification of impact reduction below industry average for at least three of the following categories, valued at 100%:
 - i. Global warming potential (greenhouse gases), in CO₂e;
 - ii. Depletion of the stratospheric ozone layer, in kg CFC-11;
 - iii. Acidification of land and water sources, in moles H⁺ or kg SO₂;
 - iv. Eutrophication, in kg nitrogen or kg phosphate;
 - v. Formation of tropospheric ozone, in kg NO_x or kg ethene; and depletion of nonrenewable energy resources, in MJ.



- 3) For 1) and 2) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site, it is valued as two times the whole product.
 - 4) For 1) and 2) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products.
- h. The number or percentage of products for which Sourcing of Raw Materials has been documented, with fractional or multiplied values as indicated below. If a product used in the Project has documented Sourcing of Raw Materials, submit one of the following:
- 1) Corporate sustainability report (CSR). Submit one of the following:
 - i. Manufacturer's self-declared report: valued as half of a product
 - ii. Third-party verified CSR which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain: valued as one whole product:
 1. Global Reporting Initiative (GRI) Sustainability Report
 2. Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
 3. U.N. Global Compact: Communication of Progress
 4. ISO 26000: 2010 Guidance on Social Responsibility
 5. Other USGBC approved programs meeting the CSR criteria
 - 2) Documentation of at least one of the responsible extraction criteria below:
 - i. Extended producer responsibility program, valued as half of a product
 - ii. Bio-based materials, valued as one whole product
 - iii. Certified Wood: Wood-based materials include all materials made from wood, including engineered wood products and wood-based panel products, valued as one whole product
 - iv. Material Reuse: Materials may be salvaged, refurbished, or reused, valued as one whole product.
 - v. Recycled content. The sum of post-consumer recycled content plus one-half the pre-consumer recycled content, based on cost, valued as one whole product.
 - vi. Other USGBC approved programs meeting leadership extraction criteria
 - 3) For 1) and 2) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site: valued as two times the whole product.
 - 4) For 1) and 2) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products. Products meeting multiple criteria may only be counted once.
- i. The number or percentage of products for which Material Ingredients have been disclosed, with fractional or multiplied values as indicated below. If a product used in the Project discloses its Material Ingredients, submit one of the following:
- 1) Chemical inventory of the product to at least 0.1% (1000 ppm), documented by one of the following:
 - i. Manufacturer Inventory
 - ii. Health Product Declarations (HPDs)
 - iii. Cradle to Cradle (C2C) certifications
 - iv. Declare product labels
 - v. ANSI/BIFMA e3 Furniture Sustainability Standard (Furniture may be included, providing it is included consistently in all MR Credits.)



- 2) Documentation of compliance with one of the following material ingredient optimization criteria programs:
 - i. GreenScreen benchmarks
 - ii. Cradle to Cradle certifications
 - iii. REACH optimizations
 - iv. Other USGBC approved programs meeting building product optimization criteria
 - 3) Documentation that the product is sourced from a manufacturer that meets all of the below supply chain optimization criteria:
 - i. Manufacturer engages in validated and robust safety, health, hazard and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material
 - ii. Manufacturer provides independent third party verification of the following conditions for their supply chain, at a minimum:
 1. Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
 2. Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
 3. Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
 4. Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
 5. Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
 6. Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain
 - 4) For 2) and 3) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site: valued as two times the whole product. Products compliant with both 2) and 3) may only be counted once.
 - 5) For 1), 2), and 3) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products.
2. LEED v4 Indoor Environmental Quality Credit Low-Emitting Materials Calculator (EQ Calculator). With each relevant product submittal, the Contractor is responsible for the completion of the EQ Calculator, which can be found on USGBC's website. The Contractor must maintain an updated EQ Calculator throughout the Project duration for all applicable products and submit the updated calculator on a monthly basis.
- a. The EQ Calculator must record information for all relevant products as outlined below. Include the following documentation. Detailed requirements are listed in b. – j. below.
 - 1) Volume used of all field applied interior adhesives, sealants, paints & coatings.
 - 2) VOC content of all field-applied interior adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon, less water.
 - 3) General Emissions Evaluation for more than 90 percent of all field-applied interior paints, coatings, adhesives, and sealants, by volume, and for 100 percent of all flooring, ceilings, walls, and thermal and acoustic insulation.
 - 4) Composite Wood Evaluation for all composite wood not covered by other categories.
 - 5) Furniture Evaluation for 90% of all furniture, by cost.



- 6) For schools/healthcare only: Exterior-Applied Products Evaluation for 90% of all exterior applied materials, measured by volume. All batt insulation products must contain no added formaldehyde.
- b. VOC REQUIREMENTS, GENERAL: The following materials must meet the listed compliance requirements for emissions and content standards, for all applicable categories. All products must comply with each applicable threshold requirement. Refer to LEED BD+C Reference Guide, EQ Credit Low-Emitting Materials for additional guidance.
- 1) General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health (CDPH), Standard Method v1.1-2010 or v1.2-2017, using the applicable exposure scenario, and stating the range of total VOCs (TVOC) after 14 days measured as specified in the CDPH Standard Method v1.1 as follows:
 - i. 0.5mg/m³ or less;
 - ii. between 0.5 and 5.0 mg/m³; or,
 - iii. 0.50 mg/m³ or more
 - 2) No product may contain any ingredients that are carcinogens, mutagens, reproductive toxins, persistent bioaccumulative compounds, hazardous air pollutants, or ozone-depleting compounds. An exception will be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black, which must be less than or equal to 1% by weight of the product.
 - 3) No product may contain the following:
 - i. methylene chloride
 - ii. 1,1,1-trichloroethane
 - iii. benzene
 - iv. toluene
 - v. ethylbenzene
 - vi. vinyl chloride
 - vii. naphthalene
 - viii. 1,2-dichlorobenzene
 - ix. di (2-ethylhexyl) phthalate
 - x. butyl benzyl phthalate
 - xi. di-n-butyl phthalate
 - xii. di-n-octyl phthalate
 - xiii. diethyl phthalate
 - xiv. dimethyl phthalate
 - xv. isophorone
 - xvi. antimony
 - xvii. cadmium
 - xviii. hexavalent chromium
 - xix. lead
 - xx. mercury
 - xxi. formaldehyde
 - xxii. methyl ethyl ketone
 - xxiii. methyl isobutyl ketone
 - xxiv. acrolein
 - xxv. acrylonitrile
 - 4) No product may contain more than 1.0% by weight of sum total of volatile aromatic compounds.
- c. VOC REQUIREMENTS FOR INTERIOR ADHESIVES AND SEALANTS:
- 1) For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content when calculated



according to South Coast Air Quality Management District (SCAQMD) Rule #1168 requirements in effect on July 1, 2005, and rule amendment date January 7, 2005:

	Allowable VOC Content (g/L):
Architectural Applications:	
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Computer diskette manufacturing	350
Contact adhesive	80
Special purpose contact adhesive	250
Tire retread	100
Adhesive primer for traffic marking tape	150
Structural wood member adhesive	140
Sheet applied rubber lining operations specialty	850
Top and Trim adhesive	250
Substrate Specific Applications:	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50
Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
Sealants:	
Architectural sealant	250
Marine deck sealant	760
Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealant	420
Sealant Primers:	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775



Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

- 2) For field applications that are inside the weatherproofing system, a minimum of 90 percent of adhesives and sealants, by volume, must comply with the requirements of the CDPH "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- d. VOC REQUIREMENTS FOR INTERIOR PAINTS AND COATINGS:
- 1) For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the SCAQMD Rule #1113, effective June 3, 2011.

Product Type:	Allowable VOC Content (g/L):
Bond Breaker	350
Clear wood finishes - Varnish	275
Clear wood finishes – Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant – Architectural Coatings, excluding IM coatings	50
Colorant – Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete – Curing compounds	100
Concrete – Curing compounds for roadways & bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings – Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings – Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150
Industrial maintenance coatings	100
Industrial maintenance coatings – High temperature IM coatings	420
Industrial maintenance coatings – Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings – Zinc rich IM primers	100



Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac- Clear	730
Shellac – Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings – repair	340
Swimming pool coatings – other	340
Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood preservatives	350
Low solids coatings	120

- 2) For field applications that are inside the weatherproofing system, 90 percent of paints and coatings must comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - e. LOW-EMITTING MATERIALS, FLOORING: Flooring must comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - f. LOW-EMITTING MATERIALS, COMPOSITE WOOD: Composite wood, agrifiber products, and adhesives must be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the CARB's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or must be made with no added formaldehyde.
 - g. LOW-EMITTING MATERIALS, CEILINGS, WALLS, THERMAL, AND ACOUSTIC INSULATION: Ceilings, walls, and thermal and acoustic insulation must comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - h. LOW-EMITTING MATERIALS, FURNITURE: At least 90 percent of furniture, measured by cost, will be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011; comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate.
 - i. LOW-EMITTING MATERIALS, EXTERIOR APPLIED MATERIALS (HEALTHCARE/ SCHOOLS ONLY): At least 90 percent of exterior applied materials, measured by volume,



must comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- 1) The following materials are prohibited and do not count toward total percentage compliance:
 - a) Hot-mopped asphalt for roofing.
 - b) Coal tar sealants for parking lots and other paved surfaces.
 - j. **LOW-EMITTING MATERIALS, ADDITIONAL LOW-EMITTING REQUIREMENTS:** If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
 - 1) If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.
 - 2) Methylene chloride and perchloroethylene may not be intentionally added in adhesives, sealants, paints or coatings.
3. **BACK-UP DOCUMENTATION:** For each material listed in the Disclosure and Optimization Calculator or the EQ Calculator, provide and submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, including but not limited to the documentation to certify the material's LEED Building attributes, as applicable:
- a. **INSTALLATION ON LOCATION:** Submit indication of the installation location of products other than adhesives, sealants, paints and coatings. Installation locations should be categorized as one of the following:
 - 1) Ceiling
 - 2) Wall
 - 3) Floor
 - 4) Subfloor
 - 5) Built-In Cabinetry
 - 6) Free-Standing Cabinetry
 - 7) Vertical Structural Elements
 - 8) Overhead Structural Elements
 - b. **RECYCLED CONTENT:** Submit published product literature or letter of certification on the manufacturer's letterhead certifying the amounts of post-consumer and/or post-industrial content.
 - c. **REGIONAL SOURCING (WITHIN 100 MILES):** Submit published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered, manufactured, distributed and the distance in miles from the Project site.
 - 1) If only some of the raw materials for a particular product or assembly originate within 100 miles of the Project site, provide the percentage (by weight) that these materials comprise in the complete product.
 - d. **BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION:** Submit published third-party or manufacturer's product literature or letter of certification, on the third-party or manufacturer's letterhead, certifying the documented disclosure and optimization information.
 - e. **VOC EMISSIONS AND CONTENT:** Submit Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products. MSDS must



indicate the VOC emissions and content of products submitted. (If an MSDS does not include a product's VOC emissions and content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer must be submitted in addition to the MSDS to indicate the VOC emissions and content). Submit product third-party certificates and test reports, stating the testing methodology and the model, to include units that are consistent with those required. For wet-applied products, the manufacturer's documentation must state each product's classification and application according to the referenced standard's definition.

4. **PRODUCT CUT SHEETS:** Submit product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.
5. **FSC-CERTIFIED WOOD:** If FSC-Certified Wood is used in the Project, submit:
 - a. Copies of vendor's invoices itemizing all new wood purchases, showing the cost for each line item.
 - b. For FSC-certified products, the vendor invoice must list product's FSC content percent and its Chain-of-Custody (CoC) certification number.
 - c. For FSC-certified products, submit the product and producer's CoC certificates.
 - d. For FSC-certified products modified on-site, submit on-site installer's CoC certification.
 - e. For assemblies, submit the percentage (by cost and by weight) of the assembly that is FSC-certified wood and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the percentage that is FSC-certified wood.
6. **HIGH ALBEDO PAVING AND WALKWAY MATERIALS:** For paving and walkway materials made from concrete or brick, submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum 3-year aged Solar Reflectance (SR) value of 0.28. If 3-year aged value information is not available, submit published product literature or letter verifying an initial SR value of at least 0.33 at installation.
7. **HIGH ALBEDO ROOFING MATERIALS:** For exposed roofing membranes, pavers, and ballast products, submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values, calculated according to ASTM E 1980. Reflectance will be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance will be measured according to ASTM E 408 or ASTM C 1371. Vegetated roof surfaces are exempt from the SRI criteria.
 - a. 82 for initial SRI, or 64 for 3-year aged SRI for low-sloped roofing applications (slope \leq 2:12)
 - b. 39 for initial SRI or 32 for 3-year aged SRI for steep-sloped roofing applications (slope $>$ 2:12)
8. **LOW MERCURY LAMPS:** For all fluorescent, compact fluorescent and HID lamps installed in the Project, submit the total number of each lamp type and submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following information. Preheat, T-9, T-10 and T-12 fluorescents or mercury vapor high-intensity discharge (HID) lamps must not be installed in the Project. For healthcare projects only, probe-start metal halide HID lamps must not be installed in any interior spaces.
 - a. The mercury content or content range per lamp in milligrams or picograms, meeting the following criteria;

Lamp	Maximum Mercury Content (milligram)
T-8 fluorescent, eight-foot	10 mg
T-8 fluorescent, four-foot	3.5 mg
T-8 fluorescent, U-bent	6 mg
T-5 fluorescent, linear	2.5 mg
T-5 fluorescent, circular	9 mg
Compact fluorescent, nonintegral ballast	3.5 mg
Compact fluorescent, integral ballast	3.5 mg, ENERGY STAR qualified



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High-pressure sodium, up to 400 watts	10 mg
High-pressure sodium, above 400 watts	32 mg

- b. The design light output per lamp (light at 40% of a lamp’s useful life) in lumens; and
 - c. The rated average life of the lamp in hours.
9. EXIT SIGNS: Illuminated exit signs must not contain mercury, and must use less than 5 watts of electricity.
 10. CONCRETE: Submit concrete mix design for each mix, designated by a distinct identifying code or number and signed by a Professional Engineer licensed in the state of New York.
 11. INTERIOR LIGHTING FIXTURES: For each lighting fixture type installed within the building’s weather barrier, submit manufacturer’s cut sheets indicating the following:
 - a. Fixture power in watts.
 - b. Initial lamp lumens.
 - c. Photometric distribution data.
 - d. Dimming capability, in range of percentages.
 12. EXTERIOR LIGHTING FIXTURES: For each lighting fixture type installed on site, submit manufacturer’s cut sheets indicating the following:
 - a. Fixture power in watts.
 - b. Initial lamp lumens.
 - c. Photometric distribution data.
 - d. Range of field adjustability, if any.
 - e. Warranty of suitability for exterior use.
 13. ALTERNATIVE TRANSPORTATION: Submit manufacturer’s cut sheets and/or shop drawings for the following items installed on site:
 - a. Bike racks, including total number of bicycle slots provided.
 - b. Signage indicating parking spaces reserved for electric or low-emitting vehicles and for carpools/vanpools, including total number of signs.
 14. WATER CONSERVING FIXTURES: For all water consuming plumbing fixtures and fittings, submit manufacturer’s cut sheets showing maximum flow rates and/or flush rates.
 15. ENERGY SAVING APPLIANCES: Submit manufacturer’s cut sheets and published product literature or letter from the manufacturer (on the manufacturer’s letterhead) verifying the product’s rating under the U.S. EPA/DOE Energy Star program, for all of the following:
 - a. Appliances (i.e., refrigerators, dishwashers, microwave ovens, televisions, clothes washers, clothes dryers, chilled water dispensers).
 - b. Office equipment (i.e., copy machines, fax machines, plotters/printers, scanners, binding and publishing equipment).
 - c. Electronics (i.e., servers, desktop computers, computer monitor displays, laptop computers, network equipment).
 - d. Commercial food service equipment.
 16. GLAZING: For glazing in any windows, doors, storefront and window wall systems, curtainwall systems, skylights, and partitions, submit manufacturer’s cut sheets indicating the following:
 - a. Glazed area.
 - b. Visible light transmittance.
 - c. Solar heat gain coefficient.
 - d. Fenestration assembly u-factor.



17. VENTILATION: Submit manufacturer's cut sheets for the following:
 - a. Carbon dioxide monitoring systems, if any, installed to measure outside air delivery.
 - b. Air filters: for detailed requirements refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS.
18. REFRIGERATION: For all refrigeration equipment, submit manufacturer's cut sheets indicating the following:
 - a. Equipment type.
 - b. Equipment life. Default values specified by the 2007 ASHRAE Applications Handbook will be used unless otherwise demonstrated by the manufacturer's guarantee and an equivalent long-term service contract.
 - c. Refrigerant type.
 - d. Refrigerant charge in pounds of refrigerant per ton of gross cooling capacity.
 - e. Tested refrigerant leakage rate, in percent per year. A default rate of 2% will be used unless otherwise demonstrated by test data.
 - f. Tested end-of-life refrigerant loss, in percent. A default rate of 10% will be used unless otherwise demonstrated by test data.

1.7 LEED BUILDING SUBMITTAL REQUIREMENTS:

- A. The LEED Building Submittal information must be assembled into one package per contract specification section(s) (or per subcontractor), and submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Incomplete or inaccurate LEED Building Submittals may be used as the basis for the rejection of products or assemblies.
- B. All final LEED Building Submittal information with back-up documentation must be submitted within two (2) months of the Project's substantial completion. If in the Project's LEED review, the USGBC or their third party reviewer requires additional documentation as it relates to the LEED Building Submittals, the Contractor must provide the requested documentation within two (2) weeks.

1.8 LEED ACTION PLANS:

- A. Construction Waste Management Plan- Refer to Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for detailed requirements.
- B. Construction IAQ Management Plan- Refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS for detailed requirements.
- C. Erosion and Sedimentation Control (ESC) Plan:
 1. The Plan must be in accordance with the New York State Department of Environmental Conservation (NYSDEC)'s New York State Standards and Specifications for Erosion and Sediment Control (Blue Book) or the 2012 EPA Construction General Permit, whichever is more stringent.
 2. The Plan must be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
 3. Detailed requirements: ESC Plan
 - a. Include the Stormwater Pollution Prevention Plan, if required.
 - b. Identify the party responsible for Plan monitoring and documentation. The party must be regularly on site.
 - c. Describe all site work that will be implemented on the Project and include timing of implementation.



- d. Submit site plan with location of ESC measures, including, but not limited to, stormwater quantity controls, stormwater quality controls, stabilized construction entrances, washdown areas, inlet/catch basin protection and perimeter controls.
 - e. Establish and clearly delineate construction buffer zones to avoid soil compaction and other construction damage to greenfields.
 - f. Describe the inspection and maintenance protocols of the ESC measures. Submit a construction schedule indicating weekly site review.
 - g. Describe reporting and documentation measures.
4. Detailed requirements: ESC Tracking Log
- a. Note date of major rain events, describe damage, describe any repairs or maintenance of specific control measures performed, and note responsible party.
 - b. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party. Submit date-stamped photographs, inspection reports or other recording processes.
 - c. Submit monthly.
5. Implementation
- a. Before Demolition and/or Construction begins, the Contractor will implement the ESC Plan, coordinate the Plan with all affected trades, and designate one individual as the Erosion and Sedimentation Control Representative, who will be responsible for communicating the progress of the Plan with the Commissioner monthly, and for assembling the required LEED documentation.
 - b. The Contractor is responsible for the provision, maintenance, and repair of all ESC measures. Any problems identified in site inspections must be resolved in a timely manner.
 - c. Demonstration. The Contractor must provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.
 - d. All subcontractors must promptly notify the ESC Representative if damage to an ESC measure is observed.
 - e. Meetings. Urgent or ongoing ESC issues must be discussed at weekly on-site job meetings.
6. All projects, including zero lot line buildings and projects that cause minimal or even no exterior site disturbance, must have ESC Plan that meets requirements.
7. Contractor must save such original documents for the life of the Project plus seven (7) years.

1.9 QUALITY ASSURANCE:

- A. The Contractor must implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and designate one individual as the Sustainable Construction Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of LEED activities with the Commissioner monthly, and for assembling the required LEED documentation. The Contractor must facilitate measurements taken by authorized parties on site for LEED compliance verification purposes.
- B. Responsibilities of Contractor's Subcontractors: The Contractor is responsible for his/her subcontractors complying with the LEED Action Plans and for providing required LEED documentation as required for the Project.
- C. Distribution and Compilation: The Contractor is responsible for distributing the LEED v4 MR Credits Calculator for Building Product Disclosure and Optimization, the LEED v4 EQ Credit Low-Emitting Materials Calculator, and any other forms or templates required for the subcontractors to record LEED documentation. The Contractor is also responsible for collecting and compiling Building Product Disclosure and Optimization and Low-Emitting Materials information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.
- D. Meetings: Sustainable design and construction issues must be discussed at the following meetings in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION:
 1. Demolition kick-off meeting



2. Construction kick-off meeting
3. Construction kick-off meeting for LEED (independent meeting)
4. Weekly job-site progress and coordination meetings
5. Closeout meeting

1.10 REFERENCES:

- A. New York State Standards and Specifications for Erosion and Sediment Control, amended November 2016: http://www.dec.ny.gov/docs/water_pdf/2016nysstanec.pdf
- B. 2012 EPA Construction General Permit: <https://www.epa.gov/npdes/epas-2012-construction-general-permit-cgp-and-related-documents>
- C. South Coast Air Quality Management District (SCAQMD), Rule 1168: www.aqmd.gov
- D. South Coast Air Quality Management District (SCAQMD), Rule 1113: www.aqmd.gov
- E. CDPH Standard Method v1.1-2010: www.cal-iaq.org
- F. ISO 17025: www.iso.org
- G. ISO Guide 65: www.iso.org
- H. CARB 93120 ATCM: arb.ca.gov/toxics/compwood/compwood.htm
- I. ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating: bifma.org
- J. ANSI/BIFMA e3-2011 Furniture Sustainability Standard: bifma.org
- K. ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling): www.iso.org
- L. ISO 14025–2006, Environmental labels and declarations (Type III Environmental Labeling): www.iso.org
- M. ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks: www.iso.org
- N. ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines: www.iso.org
- O. International Standard ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products: www.iso.org
- P. Federal Trade Commission, Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e): www.ftc.gov/bcp/gnrule/guides980427.htm
- Q. Global Reporting Initiative (GRI) Sustainability Report: www.globalreporting.org/
- R. Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises: www.oecd.org/daf/internationalinvestment/guidelinesformultinationalenterprises/
- S. U.N. Global Compact, Communication on Progress: www.unglobalcompact.org/participation/report/cop
- T. ISO 26000—2010 Guidance on Social Responsibility: www.iso.org/iso/home/standards/iso26000.htm
- U. Forest Stewardship Council: www.ic.fsc.org
- V. Sustainable Agriculture Network: www.sanstandards.org
- W. The Rainforest Alliance: www.rainforest-alliance.org/
- X. ASTM Test Method D6866: www.astm.org/Standards/D6866.htm



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- Y. Chemical Abstracts Service: www.cas.org/
- Z. Health Product Declaration: www.hpd-collaborative.org/
- AA. Cradle-to-Cradle CertifiedCM Product Standard: www.c2ccertified.org/product_certification
- BB. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH):
www.echa.europa.eu/support/guidance-on-reach-and-clp-implementation
- CC. GreenScreen: www.greenscreenchemicals.org/method/greenscreen-list-translator

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.04



**SECTION 01 81 13.10
ENVIRONMENTALLY PREFERABLE PURCHASING (EPP) COMPLIANCE**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.10

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements for all equipment, material and product purchasing to comply with the requirements of New York City Environmentally Preferable Purchasing (EPP) “Minimum Standards for Construction Products”, as established by the Mayor’s Office of Contract Services (MOCS). Refer to their website for further guidance.
- B. All sections in the Project Specifications with applicable equipment, materials and products will follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications, the more stringent requirements will prevail.
- C. This Section includes:
 - 1. Definitions
 - 2. Administrative Requirements
 - 3. Action Submittals
 - 4. Informational Submittals
 - 5. Products, Materials

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

<u>Term</u>	<u>Definition</u>
Environmentally Preferable Purchasing (EPP) Minimum Standards for Construction Products	The standard that refers to a list of equipment, materials and products that may be specified in construction contracts covered by the EPP laws and provides the applicable minimum standards referenced in the laws. See EPP Minimum Standards for Constructions Products available on MOCS’ website for a comprehensive list of all applicable definitions.



1.5 ADMINISTRATIVE REQUIREMENTS:

- A. At no additional cost to the City of New York, designate an individual who will be responsible for the communication of progress of EPP activities with the Commissioner on a regular basis and for the quality of all EPP-related materials and preparation, coordination and assembly of the supporting documentation.
- B. Scope and Applicability: Action submittals and informational submittals are required for all installed equipment, materials and products that require EPP compliance. Provide all required submittals in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- C. Distribution and Compilation: The Contractor must coordinate with all affected trades and is responsible for his/her subcontractors complying with the EPP requirements and for providing required EPP documentation as required for the project. The Contractor is responsible for distributing the forms or templates required for the subcontractors to record EPP documentation. The Contractor is also responsible for collecting and compiling information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.
- D. The Contractor must respond in a timely manner to questions and requests from the Commissioner, Design Consultant and MOCS regarding EPP requirements that are the responsibility of the Contractor. Document responses as informational submittals.

1.6 ACTION SUBMITTALS:

- A. General Requirements:
 - 1. EPP Documentation Submittals for applicable and compliant product data, as stated in the EPP Minimum Standards for Construction Products, is to be documented in the form of a Vendor Survey and supporting manufacturer's data sheets highlighting EPP compliance-related data. Include in the Vendor Survey the anticipated quantity of product purchased and cost per unit data. See attached sample Vendor Survey form.
 - 2. Compliance with EPP requirements will be used as one criterion to evaluate product selection. Assemble EPP Documentation Submittal information into one package per contract specification section(s) (or per subcontractor). Incomplete or inaccurate EPP Documentation submittals may be used as the basis for the rejection of products or assemblies.
 - 3. Update the quantities and costs in the Vendor Survey once products are approved and purchased and document as information submittal.

1.7 INFORMATIONAL SUBMITTALS

- A. For each registered contract, the Contractor must maintain a Master Vendor Survey, an updated tracking log of all equipment, materials and products purchased on a contract that are required to comply with EPP. Submit the Master Vendor Survey on a monthly basis and update the costs once products are purchased.
 - 1. Upon request by MOCS, submit the Master Vendor Survey and supporting documents.
- B. EPP Progress Reports: Concurrent with each Application for Payment, submit reports of purchasing activities for each of the EPP-applicable equipment, materials and products listed in Sub-section C below.
- C. Project Materials Cost Data: For Vendor Survey and EPP Progress Reports, include breakout of costs for the following categories of items:



1. Appliances.
2. Architectural Coatings.
3. HVAC Equipment.
4. Lighting Products.
5. Miscellaneous Products – Construction.
6. Plumbing Fixtures.

PART II – PRODUCTS

2.1 MATERIALS:

A. Detailed Requirements. This sub-section defines the information and documents to be provided for each EPP-applicable equipment, material and product type, as identified in each specification section:

1. Appliances – Residential:

All energy-using products for which the United States Environmental Protection Agency and the United States Department of Energy have developed energy efficiency standards for compliance with the Energy Star program shall be ENERGY STAR labeled. The following residential appliances shall comply with this requirement:

- a. Clothes Washers
- b. Dehumidifiers
- c. Dishwashers, Standard-Sized
- d. Freezers, Upright, Chest and Compact
- e. Refrigerators and Refrigerator-Freezers, Standard-Sized and Compact

Microwave Ovens shall comply with the following requirements:

- a. Recommended Standby Levels: 2 watts or less
- b. Best Available Standby Level: 2 watts or less

2. Architectural Coatings:

a. For the products listed below, the maximum content of Volatile Organic Compounds (VOCs) shall be determined according to the American Society for Testing and Materials test method D 5116 (Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products).

Architectural Coating	Maximum Concentration of VOC in Grams per Liter
Clear Wood Coating – Clear-Brushing lacquers	275
Clear Wood Coating – Sanding Sealers (Other than Lacquers)	275
Clear Wood Coating –Varnishes	275
Floor Coatings	100
Lacquers - Pigmented	275
Primers for Flat Paint	100
Primers for Non-Flat Paint	150
Rust Preventative/Anti-Corrosive Paint	250



b. Any product listed below that is compliant with Part 205 of Title Six of the New York Codes, Rules and Regulations meets the standard required under EPP Minimum Standards for Construction Products. The maximum content of VOCs for these products shall be determined according to the test method required under part 205.6 of such part.

Architectural Coating	Maximum Concentration of VOC in Grams per Liter
Clear Wood Coating – Conversion Varnishes	725
Clear Wood Coating – Lacquers (Including Lacquer Sanding Sealers)	550
Concrete Bond Breakers	350
Concrete Curing Compounds	350
Concrete Surface Retarders	780
Dry Fog Coatings	400
Faux Finishing Coatings	350
Fire-Resistive Coatings	350
Fire-Retardant Coatings	650
Fire-Retardant Coatings - Opaque	350
Flat Paint	100
Form Release Compounds	250
Graphic Arts Coatings (Sign Paints)	500
High Temperature Coatings	420
Industrial Maintenance (IM) Coatings	340
Low Solids Coatings	120
Magnesite Cement Coatings	450
Mastic Texture Coatings	300
Metallic Pigmented Coatings	500
Multi-Color Coatings	500
Nonflat High-Gloss Coatings	250
Nonflat Paint	150
Pre-Treatment Wash Primers	420
Primers, Sealers, and Undercoaters	200
Quick-Dry Enamels	250
Quick-Dry Primers, Sealers, and Undercoaters	200
Recycled Coatings	250
Roof Coatings	250
Roof Coatings (Bituminous)	300
Roof Primers (Bituminous)	350
Shellacs – Clear	730
Shellacs – Opaque	550
Specialty Primers, Sealers and Undercoaters	350
Stains	250
Swimming Pool Coatings and Swimming Pool Repair and Maintenance Coatings	340
Thermoplastic Rubber Coatings and Mastics	550
Waterproofing Concrete / Masonry Sealers	400
Waterproofing Sealers	250
Wood Preservatives	350



c. The products listed below shall be recovered material and comply with the Post-consumer Content and Total Recovered Materials Content requirements.

Architectural Coating	Post-consumer Content (%)	Total Recovered Materials Content (%)
Latex Paint – Consolidated	100	100
Latex Paint – Reprocessed White, Off-White and Pastel Colors	20	20
Latex Paint – Reprocessed Grey, Brown, Earthtones and Other Dark Colors	50-99	50-99

3. HVAC Equipment: Commercial and Residential

a. Commercial

All energy-using products for which the United States Environmental Protection Agency and the United States Department of Energy have developed energy efficiency standards for compliance with the Energy Star program shall be ENERGY STAR labeled. The following Commercial HVAC Equipment shall comply with this requirement:

1. Air Conditioners, Air-Cooled
2. Air Conditioners, Gas/Electric Package Units
3. Heat Pumps, Air Source

Chillers shall comply with the following Part Load Optimized Chillers IPLV and Full Load Optimized Chillers IPLV requirements:

Type	Compressor Type and Capacity	Part Load Optimized Chillers IPLV (kW/ton) Required	Full Load Optimized Chillers IPLV (kW/ton) Required
Air-Cooled	Scroll (30 – 60 tons)	0.86 or less	1.23 or less 1.1
Air-Cooled	Reciprocating (30 – 150 tons)	0.90 or less	1.23 or less 1
Air-Cooled	Screw (70 – 200 tons)	0.98 or less	1.23 or less 0.94
Water-Cooled	Centrifugal (150 – 299 tons)	0.52 or less	0.59 or less
Water-Cooled	Centrifugal (300 – 2,000 tons)	0.45 or less	0.56 or less
Water-Cooled	Rotary Screw (>150 tons)	0.49 or less	0.64 or less

b. Residential

All energy-using products for which the United States Environmental Protection Agency and the United States Department of Energy have developed energy efficiency standards for compliance with the Energy Star program shall be ENERGY STAR labeled. The following Residential HVAC Equipment shall comply with this requirement:

1. Air Conditioners, Central (<65,000 Btu/h)



2. Air Conditioners, Central, Gas/Electric Package Units (<65,000 Btu/h)
3. Air Source Heat Pumps (<65,000 Btu/h)
4. Boilers and Boiler/Hot Water Heaters (<300,000 Btu/h)
5. Ceiling Fans
6. Furnaces and Furnace/Hot Water Heaters (<340,000 Btu/h)
7. Ground Source Heat Pumps (Geothermal)
8. In-Line Ventilating Fan
9. Programmable Thermostats
10. Range Hood and Bathroom /Utility Room Ventilating Fans
11. Room Air Cleaners
12. Room Air Conditioners

4. Lighting Products

a. The following lighting products shall comply with the corresponding BEF requirement:

Product Type	Number of Lamps	Required BEF
Ballast, Fluorescent, Four-Foot, Linear T12, 34-Watts	1	2.64 or higher
Ballast, Fluorescent, Four-Foot, Linear T12, 34-Watts	2	1.41 or higher
Ballast, Fluorescent, Four-Foot, Linear T12, 34-Watts	3	0.93 or higher
Ballast, Fluorescent, Eight-Foot, Linear T12, 60-Watts	2	0.80 or higher
Ballast, Fluorescent, Four-Foot, Linear T8, 32-Watts	1	2.54 or higher
Ballast, Fluorescent, Four-Foot, Linear T8, 32-Watts	2	1.44 or higher
Ballast, Fluorescent, Four-Foot, Linear T8, 32-Watts	3	1.44 or higher
Ballast, Fluorescent, Four-Foot, Linear T8, 32-Watts	4	0.73 or higher
Ballast, Fluorescent, Eight-Foot, Linear T8, 59-Watts	2	0.80 or higher
Ballast, Fluorescent, Four-Foot, U-Bent T12, 34-Watts	1	2.64 or higher
Ballast, Fluorescent, Four-Foot, U-Bent T12, 34-Watts	2	1.41 or higher
Ballast, Fluorescent, Four-Foot, U-Bent T12, 34-Watts	3	0.93 or higher
Ballast, Fluorescent, U-Tube, U-Bent T8, 32-Watts	1	2.54 or higher
Ballast, Fluorescent, U-Tube, U-Bent T8, 32-Watts	2	1.44 or higher
Ballast, Fluorescent, U-Tube, U-Bent T8, 32-Watts	3	0.93 or higher
Ballast, Fluorescent, U-Tube, U-Bent T8, 32-Watts	4	0.73 or higher

b. All energy-using products for which the United States Environmental Protection Agency and the United States Department of Energy have developed energy efficiency standards for compliance with the Energy Star program shall be ENERGY STAR labeled. The following Lighting Products shall comply with this requirement:

1. Exit Signs
2. Luminaires, Residential



c. Luminaires, Downlight, With Compact Fluorescent Lamps (13-32 Lamp Wattage) shall comply with the following LER requirements:

Luminaire Type (NEMA Designation)	Required LER
Open Optics	29 or higher
Baffled Optics	21 or higher
Lensed Optics	24 or higher

d. Luminaires, Downlight, With Metal Halide Lamps (<150 Watts) shall comply with the following LER requirements:

Luminaire Type (NEMA Designation)	Required LER
Open Optics	35 or higher
Lensed Optics	30 or higher

e. Luminaires, Fluorescent shall comply with the following LER requirements:

Luminaire Type (NEMA Designation)	Number of Lamps	Required LER
Lensed (FL)	2	62 or higher
Lensed (FL)	3	61 or higher
Lensed (FL)	4	61 or higher
VDT-Preferred Louvered (FP)	2	50 or higher
VDT-Preferred Louvered (FP)	3	51 or higher
VDT-Preferred Louvered (FP)	4	54 or higher
Four-Foot (FW)	2	63 or higher
Four-Foot (FW)	4	62 or higher
Four-Foot (FS)	1	70 or higher
Four-Foot (FS)	2	70 or higher
Four-Foot (FI)	1	67 or higher
Eight-Foot (FI)	2	68 or higher

f. Luminaires, Industrial HID, With High Pressure Sodium Lamps (<150 Lamp Wattage) shall comply with the following LER requirements:

Upward Efficiency	Lamp Wattage	Closed Fixture (HR) LER Required	Open Fixture (HR) LER Required
0%	150-399	58 or higher	68 or higher
0%	400-999	63 or higher	84 or higher
0%	>1000	N/A	N/A
1%-10%	150-399	64 or higher	63 or higher
1%-10%	400-999	82 or higher	89 or higher
1%-10%	>1000	N/A	109 or higher
11%-20%	150-399	N/A	78 or higher



11%-20%	400-999	N/A	94 or higher
11%-20%	>1000	N/A	N/A
>20%	150-399	75 or higher	77 or higher
>20%	400-999	N/A	N/A
>20%	>1000	N/A	N/A

5. Miscellaneous Products – Construction

- a. For the products listed below, the maximum content of Volatile Organic Compounds (VOCs) shall be determined according to the American Society for Testing and Materials test method D 5116 (Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products). The products may not contain any volatile organic compound in any concentration exceeding that specified below. Products that are compliant with the Green Label Plus program of the Carpet and Rug Institute are also compliant with this standard.

Carpet Adhesives		
Volatile Organic Compound	24-Hour Testing Maximum Emission Factor (µg/m²•hr)	14-Day Testing Maximum Emission Factor (µg/m²•hr)
Formaldehyde	50	31
2-ethyl-1-hexanol	300	300
Total Volatile Organic Compounds	800	N/A
Carpet Cushions		
Volatile Organic Compound	24-Hour Testing Maximum Emission Factor (µg/m²•hr)	14-Day Testing Maximum Emission Factor (µg/m²•hr)
Butylated Hydroxytoluene	300	N/A
Formaldehyde	50	N/A
4-Phenylcyclohexene (4PCH)	50	N/A
Total Volatile Organic Compounds	1000	N/A
Carpets		
Volatile Organic Compound	24-Hour Testing Maximum Emission Factor (µg/m²•hr)	14-Day Testing Maximum Emission Factor (µg/m²•hr)
Formaldehyde	50	30
4-Phenylcyclohexene	50	17
Styrene	410	410
Total Volatile Organic Compounds	500	N/A



b. The products listed below shall comply with the Recycled Post-consumer Content and Total Recovered Materials Content requirements.

Carpet Cushion – Bonded Polyurethane		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Old Carpet Cushion	15-50	15-50
Carpet Cushion – Jute		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Burlap	40	40
Carpet Cushion – Rubber		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Tire Rubber	60-90	60-90
Carpet Cushion – Synthetic Fibers		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Carpet Fabrication Scrape	No Range Recommended	100
Cement and Concrete		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Cenospheres	No Range Recommended	Minimum 10% (by volume)
Coal fly Ash	No Range Recommended	No Range Recommended
GGBF Slag	No Range Recommended	No Range Recommended
Silica Fume	No Range Recommended	5-10% of cementitious material (dry weight basis)
Channelizers		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Plastic	25-90	No Range Recommended
Rubber (base only)	100	No Range Recommended
Delineators – Fixed		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Plastic	25-90	No Range Recommended
Rubber (base only)	100	No Range Recommended
Steel (BOF, base only)	16	25-30
Steel (BOF, base only)	67	100
Delineators – Flexible		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Plastic PET	25-85	No Range Recommended
Floor Tiles		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Rubber	90-100	No Range Recommended
Plastic	No Range Recommended	90-100
Insulation - Cellulose		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)



Post-consumer Paper	75	75
Insulation - Foam-In-Place		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Recovered Material	No Range Recommended	5
Insulation - Glass Fiber Reinforced		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Recovered Material	No Range Recommended	6
Insulation - Laminated Paperboard		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Post-consumer Paper	100	100
Insulation - Perlite Composition Board		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Post-consumer Paper	23	23
Insulation - Phenolic Rigid Foam	Insulation - Phenolic Rigid Foam	Insulation - Phenolic Rigid Foam
Material	Material	Material
Recovered Material	Recovered Material	Recovered Material
Insulation - Plastic, Non-woven Batt	Insulation - Plastic, Non-woven Batt	Insulation - Plastic, Non-woven Batt
Material	Material	Material
Recovered and/or Post-consumer Plastic	Recovered and/or Post-consumer Plastic	Recovered and/or Post-consumer Plastic
Insulation - Plastic Rigid Foam, Polyisocyanurate/Polyurethane: Rigid Foam	Insulation - Plastic Rigid Foam, Polyisocyanurate/Polyurethane: Rigid Foam	Insulation - Plastic Rigid Foam, Polyisocyanurate/Polyurethane: Rigid Foam
Material	Material	Material
Recovered Material	Recovered Material	Recovered Material
Insulation - Structural Fiberboard	Insulation - Structural Fiberboard	Insulation - Structural Fiberboard
Material	Material	Material
Recovered Material	Recovered Material	Recovered Material
Modular Threshold Ramps	Modular Threshold Ramps	Modular Threshold Ramps
Material	Material	Material
Steel (BOF)	Steel (BOF)	Steel (BOF)
Steel (EAF)	Steel (EAF)	Steel (EAF)
Aluminum	Aluminum	Aluminum
Rubber	Rubber	Rubber



Nonpressure Pipe		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Steel (BOF)	16	25-30
Steel (EAF)	67	100
Plastic (HDPE)	100	100
Plastic (PVC)	5-15	25-100
Cement	No Range Recommended	No Range Recommended
Playground Equipment		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Plastic	90-100	100
Plastic Composite	50-75	95-100
Steel (BOF)	16	95
Steel (EAF)	50-100	95-100
Restroom Dividers/Partitions, Steel		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Steel (from BOF)	16	25-30
Steel (from EAF)	67	100
Roofing Materials		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Steel (BOF)	16	25-30
Steel (EAF)	67	100
Aluminum	20-95	20-95
Fiber (felt) or Fiber Composite	50-100	50-100
Rubber	12-100	100
Plastic or Plastic/Rubber Composite	100	100
Wood/Plastic Composite	No Range Recommended	100
Cement	No Range Recommended	No Range Recommended
Shower Dividers/Partitions, Steel		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Steel (from BOF)	16	25-30
Steel (from EAF)	67	100
Traffic Barricades		
Material	Recovered Post-consumer Content (%)	Total Recovered Materials Content (%)
Plastic (High Density Polyethylene [HDPE], Low-Density Polyethylene [LDPE], Polyethylene terephthalate [PET])	80-100	100
Steel (BOF)	16	25-30
Steel (EAF)	67	100
Fiberglass	No Range Recommended	No Range Recommended

c. All energy-using products for which the United States Environmental Protection Agency and the United States Department of Energy have developed energy efficiency standards for compliance with the Energy Star program shall be ENERGY STAR labeled. The following Construction Products shall comply with this requirement:

ENVIRONMENTALLY PREFERABLE PURCHASING (EPP) COMPLIANCE



1. Entry or Patio Doors, Residential
 2. Residential Skylights
 3. Residential Windows & Tubular Daylighting Devices
 4. Roof Products
- d. Electric Motors shall comply with the following Nominal Efficiencies requirements:

Nominal Efficiencies for Induction Motors Rated 600 Volts or Less (Random Wound)						
Motor Size (HP)		Open Drip-Proof (ODP)		Totally Enclosed Fan-Cooled (TEFC)		
6-pole (1200 rpm)	4-pole (1200 rpm)	2-pole (1200 rpm)	6-pole (1200 rpm)	4-pole (1200 rpm)	2-pole (1200 rpm)	
1	82.5	85.5	77.0	82.5	85.5	77.0
1.5	86.5	86.5	84.0	87.5	86.5	84.0
2	87.5	86.5	85.5	88.5	86.5	85.5
3	88.5	89.5	85.5	89.5	89.5	86.5
5	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91.0	88.5	91.0	91.7	89.5
10	91.7	91.7	89.5	91.0	91.7	90.2
15	91.7	93.0	90.2	91.7	92.4	91.0
20	92.4	93.0	91.0	91.7	93.0	91.0
25	93.0	93.6	91.7	93.0	93.6	91.7
30	93.6	94.1	91.7	93.0	93.6	91.7
40	94.1	94.1	92.4	94.1	94.1	92.4
50	94.1	94.5	93.0	94.1	94.5	93.0
60	94.5	95.0	93.6	94.5	95.0	93.6
75	94.5	95.0	93.6	94.5	95.4	93.6
100	95.0	95.4	93.6	95.0	95.4	94.1
125	95.0	95.4	94.1	95.0	95.4	95.0
150	95.4	95.8	94.1	95.8	95.8	95.0
200	95.4	95.8	95.0	95.8	96.2	95.4
250	95.4	95.8	95.0	95.8	96.2	95.8
300	95.4	95.8	95.4	95.8	96.2	95.8
350	95.4	95.8	95.4	95.8	96.2	95.8
400	95.8	95.8	95.8	95.8	96.2	95.8
450	96.2	96.2	95.8	95.8	96.2	95.8
500	96.2	96.2	95.8	95.8	96.2	95.8



Nominal Efficiencies for Induction Motors Rated Medium Voltage or Less (Form Wound)					
Motor Size (HP)		Open Drip-Proof (ODP)		Totally Enclosed Fan-Cooled (TEFC)	
6-pole (1200 rpm)	4-pole (1200 rpm)	2-pole (1200 rpm)	6-pole (1200 rpm)	4-pole (1200 rpm)	2-pole (1200 rpm)
250-500	95.0	95.0	94.5	95.0	95.0

6. Plumbing Fixtures.

The plumbing fixtures shall comply with the following Water Efficiency requirements:

Plumbing Fixture	Water Efficiency Requirement
Lavatory Faucets	< 2.0 gallons per minute
Showerheads, Residential and Commercial	< 2.2 gallons per minute
Toilets, Residential and Commercial	< 1.6 gallons per flush
Urinals, Residential and Commercial	< 1.0 gallons per flush

PART III – EXECUTION (Not Used)

END OF SECTION 018113.10



EPP VENDOR SURVEY FORM

Instructions: In the space provided, indicate the following: (1.) Choose Construction for the EPP Book Used (2.) Choose the product type from the drop-down menu; (3.) Choose the product detail from the drop-down menu; (4.) Identify the specific item under Product Description; (5.) Enter the number of products per unit; (6.) Enter the cost per unit; (7.) Enter the units purchased; (8.) Enter the total cost.

Return completed spreadsheet to the contracting agency in the accompanying letter. Thank you.

Agency Acronym	Environmental Preferable Purchasing Information				Quantity and Cost Information				Comments
	EPP Book Used	Product Type	Product Details	Product Description	Products Per Unit	Cost Per Unit	Units Purchased	Total Cost	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
DDC								\$0.00	
TOTAL					0.00	\$0.00	0.00	\$0.00	



SECTION 01 81 13.13

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.13

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for the project.
- B. All sections in the Project Specifications with adhesives, sealant or sealant primer applications, paints and coatings will follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications regarding adhesives, sealant or sealant applications, paints and coatings, the requirements set forth in this Section will prevail.
- C. This Section includes:
 - 1. General Requirements
 - 2. References
 - 3. VOC Requirements for Interior Adhesives
 - 4. VOC Requirements for Interior Sealants
 - 5. VOC requirements for Interior Paints
 - 6. VOC requirements for Interior Coatings
 - 7. Submittals

1.3 RELATED SECTIONS: include without limitation the following:

- | | | |
|----|---------------------|---|
| A. | Section 01 10 00 | SUMMARY |
| B. | Section 01 31 00 | PROJECT MANAGEMENT AND COORDINATION |
| C. | Section 01 32 00 | CONSTRUCTION PROGRESS DOCUMENTATION |
| D. | Section 01 33 00 | SUBMITTAL PROCEDURES |
| E. | Section 01 73 00 | EXECUTION |
| F. | Section 01 77 00 | CLOSEOUT PROCEDURES |
| G. | Section 01 78 39 | CONTRACT RECORD DOCUMENTS |
| H. | Section 01 81 13.03 | SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS |
| I. | Section 01 81 13.04 | SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS |
| J. | Section 01 81 19 | INDOOR AIR QUALITY FOR LEED BUILDINGS |



1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

ADHESIVE	Any substance used to bond one surface to another by attachment. Includes adhesive primers and adhesive bonding primers. A. Aerosol Adhesive: Any adhesive packaged as an aerosol with a spray mechanism permanently housed in a non-refillable can designed for hand-held application without the need for ancillary equipment.
CARCINOGEN	A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (IARC) (Groups 1, 2A, and 2B), the National Toxicology Program (NTP) (Groups 1 and 2), the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the Occupational Safety and Health Administration (OSHA).
CLEAR WOOD FINISH	Clear/semi-transparent coating applied to wood substrates to provide a transparent or translucent solid film. 1. Lacquer: Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film. 2. Sanding Sealer: A sanding sealer that also meets the definition of a lacquer. 3. Varnish: Clear/semi-transparent coating, excluding lacquers and shellacs, formulated to dry by chemical reaction on exposure to air. May contain small amounts of pigment.
COATING	Liquid, liquefiable, or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer; and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics; and is intended for on-site application to interior or exterior surfaces of buildings. Does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings or paint sold in aerosol cans.
FLOOR COATING	Opaque coating applied to flooring. Excludes industrial maintenance coatings.
HAZARDOUS AIR POLLUTANT	Any compound listed by the U.S. EPA in the Clean Air Act, Section 112(b)(1) as a hazardous air pollutant.



MUTAGEN	A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).
OZONE-DEPLETING COMPOUNDS	A compound with an ozone-depletion potential greater than 0.1 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
PAINT	A pigmented coating. For the purposes of this specification, paint primers are considered to be paints. <ol style="list-style-type: none"> 1. Flat Coating or Paint: Has a gloss of less than 15 (using an 85-degree meter) or less than 5 (using a 60-degree meter). 2. Non-Flat Coating or Paint: Has a gloss of greater than or equal to 15 (using an 85-degree meter) or greater than or equal to 5 (using a 60-degree meter). 3. Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree meter). 4. Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing the corrosion of ferrous metal substrates.
PRIMER	Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate; or to provide a smooth surface for application of a subsequent coating.
REPRODUCTIVE TOXIN	A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).
SANDING SEALER	Clear/semi-transparent coating formulated to seal bare wood. Can be abraded to create a smooth surface for subsequent coatings. Does not include sanding sealers that are lacquers (see Clear Wood Finish above).
SEALANT	Any material with adhesive properties, formulated primarily to fill, seal, or waterproof gaps or joints between surfaces. Includes sealant primers and caulks.



SHELLAC	Clear or pigmented coating formulated solely with the resinous secretions of the lac beetle, thinned with alcohol and formulated to dry by evaporation without chemical reaction. Excludes floor applications.
STAIN	Clear semi-transparent/opaque coating formulated to change the color but not conceal the grain pattern or texture of the substrate.
VOLATILE AROMATIC COMPOUND	Any hydrocarbon compound containing one or more 6-carbone benzene rings, and having an initial boiling point less than or equal to 280 degrees Celsius measured at standard conditions of temperature and pressure.
VOLATILE ORGANIC COMPOUND	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.
WATERPROOFING SEALER	A coating that prevents the penetration of water into porous substrates.

1.5 GENERAL REQUIREMENTS:

- A. The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED Green building rating. Specific project requirements related to this goal which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor must ensure that the requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, must not be allowed if such changes compromise the stated environmental goals.

1.6 REFERENCES:

- A. Rule 1168 – “Adhesive and Sealant Applications”, amended 7 January 2005): South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov
- B. Rule 1113 - “Architectural Coatings”, amended 9 July 2004: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov
- C. Green Seal Standard GS-11- “Paints”, of Green Seal, Inc., Washington, DC, www.greenseal.org
- D. Green Seal Standard GC-03- “Anti-Corrosive Paints”, of Green Seal, Inc., Washington, DC, www.greenseal.org

1.7 VOC REQUIREMENTS FOR INTERIOR ADHESIVES, SEALANTS, PAINTS AND COATINGS:

- A. GENERAL: Unless otherwise specified herein, the VOC content of all interior adhesives, sealants, paints and coatings (herein referred to as “products”) must not be in excess of **250 grams per liter**.
- B. No product may contain any ingredients that are carcinogens, mutagens, reproductive toxins, persistent bioaccumulative compounds, hazardous air pollutants, or ozone-depleting compounds. An exception must be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black, which must be less than or equal to 1% by weight of the product.

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES,
SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS



- C. No product will contain the following:
 - 1. methylene chloride
 - 2. 1,1,1-trichloroethane
 - 3. benzene
 - 4. toluene
 - 5. ethylbenzene
 - 6. vinyl chloride
 - 7. naphthalene
 - 8. 1,2-dichlorobenzene
 - 9. di (2-ethylhexyl) phthalate
 - 10. butyl benzyl phthalate
 - 11. di-n-butyl phthalate
 - 12. di-n-octyl phthalate
 - 13. diethyl phthalate
 - 14. dimethyl phthalate
 - 15. isophorone
 - 16. antimony
 - 17. cadmium
 - 18. hexavalent chromium
 - 19. lead
 - 20. mercury
 - 21. formaldehyde
 - 22. methyl ethyl ketone
 - 23. methyl isobutyl ketone
 - 24. acrolein
 - 25. acrylonitrile

- D. No product will contain more than 1.0% by weight of sum total of volatile aromatic compounds.

1.8 VOC REQUIREMENTS FOR INTERIOR ADHESIVES:

- A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers, or adhesive primers used in this project must not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.
- C. For specified building construction related applications, the allowable VOC content is as follows:
 - 1. Architectural Applications:

a. Indoor carpet adhesive	50
b. Carpet pad adhesive	50
c. Wood flooring adhesive	100
d. Rubber floor adhesive	60
e. Subfloor adhesive	50
f. Ceramic tile adhesive	65
g. VCT and asphalt tile adhesive	50
h. Drywall and panel adhesive	50
i. Cove base adhesive	50
j. Multipurpose construction adhesive	70
k. Structural glazing adhesive	100
 - 2. Specialty Applications:

a. PVC welding	510
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- b. CPVC welding 490
- c. ABS welding 325
- d. Plastic cement welding 250
- e. Adhesive primer for plastic 550
- f. Contact Adhesive 80
- g. Special Purpose Contact Adhesive 250
- h. Structural Wood Member Adhesive 140
- i. Sheet Applied Rubber Lining Operations 850
- j. Top and Trim Adhesive 250
- 3. Substrate Specific Applications:
 - a. Metal to metal 30
 - b. Plastic foams 50
 - c. Porous material (except wood) 50
 - d. Wood 30
 - e. Fiberglass 80
- 4. Aerosol Adhesives:
 - a. General purpose mist spray 65% VOC's by weight
 - b. General purpose web spray 55% VOC's by weight
 - c. Special purpose aerosol adhesives (all types) 70% VOC's by weight

1.9 VOC REQUIREMENTS FOR INTERIOR SEALANTS:

- A. The volatile organic compound (VOC) content of sealants, or sealant primers used in this project must not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.
 - 1. Sealants:
 - a. Architectural 250
 - b. Non-membrane roof 300
 - c. Roadway 250
 - d. Single-ply roof membrane 450
 - e. Other 420
 - 2. Sealant Primer:
 - a. Architectural – Nonporous 250
 - b. Architectural – Porous 775
 - c. Other 750

1.10 VOC REQUIREMENTS FOR INTERIOR PAINTS:

- A. Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) must meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:
 - 1. Volatile Organic Compounds:
 - a. The VOC concentrations (in grams per liter) of the product must not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Interior Paints and Primers:
Non-flat: 150 g/l



Flat: 50 g/l

The calculation of VOC must exclude water and tinting color added at the point of sale.

- B. Anti-Corrosive and Anti-Rust Paints: Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must meet the VOC limitations of the Green Seal Paint Standard GC-03, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

- 1. Volatile Organic Compounds:

- a. The VOC concentrations (in grams per liter) of the product must not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Anti-Corrosive and Anti-Rust Paints: 250 g/l

The calculation of VOC must exclude water and tinting color added at the point of sale.

1.11 VOC REQUIREMENTS FOR INTERIOR COATINGS:

- A. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior must meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

- 1. Clear Wood Finishes:
 - a. Varnish 350
 - b. Sanding Sealers 350
 - c. Lacquer 550
- 2. Shellac:
 - a. Clear 730
 - b. Pigmented 550
- 3. Stains 250
- 4. Floor Coatings 100
- 5. Waterproofing Sealers 250
- 6. Sanding Sealers 275
- 7. Other Sealers 200

The calculation of VOC must exclude water and tinting color added at the point of sale.

1.12 SUBMITTALS:

- A. Submit Material Safety Data Sheets, for all applicable products in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets must indicate the Volatile Organic Compound (VOC) limits of products submitted. (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Submit Environmental Building Materials Certification Form (EBMCF) as referenced in Section 01 81 13.03 SUSTAINABLE REQUIREMENTS FOR LEED v3 BUILDINGS: For each field-applied adhesive, sealant, paint, and coating product, provide the VOC requirement, as provided in this Specification, for the relevant material category indicated on the documentation noted above.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.13



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
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**SECTION 01 81 19
INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 19

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT:

- A. The City of New York has determined that this Project must minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on-site, and poor housekeeping, must be minimized.

1.3 RELATED SECTIONS:

- A. All sections of the Specifications related to interior construction, MEP systems and items affecting indoor air quality.
- B. Division 9 (of the Specifications): Finishes.
- C. Refer to the Addendum to identify whether this project is designed to comply with a Certification Level according to the U.S. Green Building Council’s LEED Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
- D. Refer to the Addendum to identify whether this project is designed to comply with Section 01 81 13.13 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS.
- E. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS.

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
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Volatile Organic Compounds (VOCs)	Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives, composite wood binder, and foam insulations. Not all VOCs are harmful, but many of those contained within building products contribute to the formation of smog and may irritate building occupants by their smell or health impact.
Materials that act as “sinks” for VOC contamination	Absorptive materials, typically dry and soft materials (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOCs emitted by “source” materials and release them over a prolonged period of time.
Materials that act as “sources” for VOC contamination	Products with high VOC contents that emit VOCs either rapidly during application and curing (typically “wet” products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically “dry” products such as flooring coverings with plasticizers and engineered wood with formaldehyde).

1.5 REFERENCES, RESOURCES:

- A. “IAQ Guidelines for Occupied Buildings Under Construction”, Second Edition, 2007, The Sheet Metal and Air Conditioner Contractors National Association (SMACNA). (703) 803-2980, www.smacna.org.
- B. ANSI/ASHRAE 52.2-2007, “Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size”, www.ashrae.org.

1.6 LEED BUILDING GENERAL REQUIREMENTS:

- A. Implement practices and procedures as necessary to meet the Project’s environmental performance goals as set forth in the specific requirements of this section. Specific Project goals that may impact this area of work include: use of recycled-content materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this section, are implemented to the fullest extent. Substitutions or other changes to the work will not be allowed if such changes compromise the stated LEED building performance criteria.

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN:

- A. The Contractor must prepare a Construction IAQ Management Plan in coordination with each Subcontractor and submit the Construction IAQ Management Plan to the Commissioner for approval in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. The Construction IAQ Management Plan must meet the following criteria:
 1. Construction activities must be planned to meet or exceed the minimum requirements of SMACNA’s “IAQ Guidelines for Occupied Buildings under Construction”, Second Edition, 2007.
 2. Absorptive materials must be protected from moisture damage when stored on-site and after installation.
 3. The planned operation of air handlers during construction must be described. If air handlers are to be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grille and return or transfer duct inlet opening, such that there is no bypass around the filtration media, as determined by ASHRAE 52.2-2007.
 4. Filtration media must be replaced immediately prior to occupancy. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2-2007.
 5. A sequence of finish installation plan “Plan” must be developed, highlighting measures to reduce the absorption of VOCs by materials that act as “sinks”.



6. The use of tobacco products is prohibited inside the building and within 25 feet of the building entrance during construction.
 7. A flush-out or air testing must be performed.
 8. Upon approval of the finish installation plan by the Commissioner, it must be implemented by the Contractor through the duration of the construction process, and documented in accordance with the Submittal Requirements of Sub-Section 1.8 herein.
- B. Detailed requirements of the Construction IAQ Management Plan are as follows:
1. SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction", outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan must be organized in accordance with the SMACNA format, and must address measures to be implemented in each of the five categories (including subsections). All subsections must be listed in the Plan; items that are not applicable for this Project should be listed as such.
 - a. HVAC Protection
 - 1) Protect air handling, distribution equipment and air supply, and return ducting during construction.
 - 2) All ductwork arriving on site will be sealed with plastic sheeting and stored on pallets or dunnage until installed.
 - 3) Cover and protect all exposed air inlets and outlets, openings, grilles, ducts, plenums, etc. to prevent water, moisture, dust and other contaminant intrusion.
 - 4) Apply protection immediately after ducting.
 - 5) Protect ducting runs at the end of day's work.
 - 6) Inspect temporary filtration weekly and replace as required to maintain the proper ventilation rates in the building.
 - 7) To reduce debris and contamination to mechanical systems, do not store materials in mechanical rooms.
 - b. Source Control
 - 1) Protect stored on-site or installed absorptive or porous materials. Store materials in dry conditions indoors, under cover, and off the ground or floor.
 - 2) Do not use wet or damaged porous materials in the building. Materials which become contaminated through direct exposure to moisture from precipitation, plumbing leaks, or condensation must be replaced by the Contractor, at no additional cost to the City of New York.
 - 3) Use low-toxicity and low-VOC materials to the greatest extent possible.
 - 4) Recover, isolate, and ventilate containers housing toxic materials and materials with VOC levels above the limits for interior adhesives, sealants, paints, and coatings described in these Specifications.
 - 5) Prevent exhaust fumes from idling vehicles, equipment and fossil-fueled tools from entering the building.
 - 6) Containers housing toxic materials and materials with VOC levels above the limits for interior adhesives, sealants, paints, and coatings described in these Specifications, must be closed when not in use.
 - 7) Enforce the no-smoking job site policy.



- c. Pathway Interruption
 - 1) Depressurize work areas which contain dust and odors.
 - 2) Pressurize occupied spaces to prevent intrusion of dust and odors.
 - 3) Erect barriers to contain construction areas.
 - 4) Relocate pollutant sources.
 - 5) Temporarily seal the building and provide 100% outside air for ventilation.
 - 6) Provide walk-off mats at entryways to reduce introduced dirt and pollutants.
 - 7) Use dust guards and collectors on saws and other tools.
 - d. Housekeeping
 - 1) Store materials on elevated platforms under cover, in a designated dry, clean location, prior to unpacking for installation.
 - 2) If materials are not stored in an enclosed location, cover tops and sides of material with waterproof sheeting, securely tied.
 - 3) Institute cleaning activities to remove contaminants from the building prior to occupancy. Clean all coils, air filters and ductwork prior to performing testing, adjusting and balancing of HVAC systems.
 - 4) Sweep the work area on a daily basis. Use an efficient and effective dust collecting method such as damp cloth, wet mop, or vacuum with high-efficiency particulate filters. Activities which produce high levels of dust must be cleaned up immediately upon completion.
 - 5) Spills or excess applications of products containing solvents, or with VOC levels above the limits for interior adhesives, sealants, paints and coatings described in these Specifications, must be removed immediately.
 - 6) Dust all walls prior to application of finishes.
 - 7) Vacuum all stud tracks prior to application of insulation.
 - 8) Keep materials organized to improve job safety as well as indoor air quality.
 - e. Scheduling
 - 1) Phase construction such that absorptive materials are installed only in areas that are weathertight.
 - 2) Schedule activities that utilize “sources” of VOC contamination to take place prior to installing high absorbent materials that will act as “sinks” for contaminants.
 - 3) Review of the appropriate components of the Construction IAQ Management Plan must be a regular action topic at weekly site coordination meetings. Implementation of the Plan must be documented in the meeting minutes.
- 2. Protection of Materials from Moisture Damage: As part of the “Source Control” section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage must be described. This section must also describe corrective measures to be taken if moisture damage does occur to absorptive materials during the course of construction (see Section 1.7 B.1.b).
 - 3. Replacement of Filtration Media: Under the “HVAC Protection” section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment must be provided.



The description must include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.

4. Sequence of Finish Installation for Materials: Where feasible, absorptive materials must be installed after the installation of materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.
5. Pre-Occupancy Phase: Perform either a flush-out or air sample testing (Options 1 or 2, respectively), as follows:

a. OPTION 1 — Flush-Out

- 1) Perform flush-out using either Path 1 or Path 2.
 - i. Path 1: After construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and no higher than 80 degrees F and relative humidity no higher than 60%.
 - ii. Path 2: If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cu.ft. of outdoor air per sq.ft. of floor area to the space. Once a space is occupied, it must be ventilated at a minimum rate of 0.30 cfm/sq.ft. of outside air or the design minimum outside air rate determined in IEQ Prerequisite: Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cu.ft./sq.ft. of outside air has been delivered to the space.
- 2) Commissioning can occur during flush-out, at the discretion of the Commissioner, provided none of the commissioning procedures introduce contaminants into the space and none of the flush-out procedures circumvent the commissioning process. Complete testing and balancing of the HVAC system after the flush-out is complete. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS.
- 3) If even partial construction work occurs during the flush-out, the flush-out must be started again from the beginning for that space. If multiple, discrete HVAC systems operate independently, flush-out may be completed in portions of the building as work is completed in each area served by a given system.

OR

b. OPTION 2 — Air Testing

- 1) Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with current versions of the United States Environmental Protection Agency “Compendium of Methods for the Determination of Air Pollutants in Indoor Air” or ISO methods, as additionally detailed in the USGBC “LEED BD+C Reference Guide.”



- 2) Demonstrate that the contaminant maximum concentrations listed below are not exceeded.

CONTAMINANT	MAXIMUM CONCENTRATION
Formaldehyde	27 parts per billion
Particulates (PM10 for all buildings; PM25 for buildings in EPA nonattainment areas, or local equivalent)	PM10: 50 micrograms per cubic meter PM25: 15 micrograms per cubic meter
Ozone (for buildings in EPA nonattainment areas)	0.075 parts per million
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
Target chemicals listed in the California Department of Public Health (CDPH) Standard Method c1.1, Table 4-1, except formaldehyde	CDPH Standard Method v1.1-2010, Allowable Concentrations, Table 4-1
Carbon Monoxide (CO)	9 part per million and no greater than 2 parts per million above outdoor levels

- 3) The air sample testing must be conducted as follows:
- i. All measurements must be conducted prior to occupancy, but during normal occupied hours and with the building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.
 - ii. The building must have all interior finishes installed, including but not limited to millwork, doors, paint, carpet and acoustic tiles. Non-fixed furnishings such as workstations and partitions are required to be in place for the testing.
 - iii. Prior to air sample testing, all punch-list items that would generate VOCs or other contaminants, the testing and balancing of the HVAC system and finalization of all cleaning must be completed. Use low-emitting cleaning products and vacuum cleaners with HEPA filtration.
 - iv. The number of sampling locations will vary depending upon the size of the building and number of ventilation systems. For each portion of the building served by a separate ventilation system, the number of sampling points must not be less than one per 25,000 sq.ft., or for each contiguous floor area, whichever is larger, and include areas with the least ventilation and greatest presumed source strength.
 - v. Air samples must be collected between 3 feet and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum 4-hour period.
 - vi. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.
6. Implementation and Coordination: Before Demolition and/or Construction begins, the Contractor must implement the Construction IAQ Management Plan, coordinate the Construction IAQ Management Plan with all affected trades, and designate one individual as the Construction IAQ Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of the Construction IAQ Management Plan with the Commissioner monthly and for assembling the required LEED documentation. Include provisions in the Construction



IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order or to rectify non-compliant conditions.

- a. Distribution: The Contractor must distribute copies of the Construction IAQ Management Plan in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- b. Instruction: The Contractor must provide on-site instruction of appropriate site management to all Contractor's Subcontractors.
- c. Monitoring: The Construction IAQ Representative must monitor the implementation of the Construction IAQ Management Plan.

1.8 SUBMITTALS:

- A. Submit the following LEED-required records and documents in accordance with Section 01 33 00 SUBMITTAL PROCEDURES and, as applicable, Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.
- B. A copy of the Construction IAQ Management Plan as defined in Sub-Section 1.7 herein.
- C. IAQ Tracking Log
 1. Note date of observed major Construction IAQ issues, describe any damage, describe any repairs or maintenance of specific control measures performed and note responsible party.
 2. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party. Provide date-stamped photographs, inspection reports or other recording processes.
 3. Submit log monthly.
- D. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets must be submitted with the Contractor's or Subcontractor's "approved" stamp as confirmation that the products are the products installed on the Project.
- E. PHOTOGRAPHS: Submit to the Commissioner a minimum of 18 photographs as required under the provision for special photographs, in accordance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION, comprised of at least six photographs taken on three different occasions during construction of each IAQ measure. The photographs must document the implementation of the Construction IAQ Management Plan throughout the course of the Project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs must include integral date stamping, and must be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to Project meeting minutes or similar Project documents which reference to the Construction IAQ Management Plan measure documented.
- F. A copy of the Project's "Testing, Adjusting and Balancing" (TAB) report, if applicable.

1.9 QUALITY ASSURANCE:

- A. The Contractor will be responsible for preparing and implementing the Construction IAQ Management Plan and must coordinate and incorporate the work of its Subcontractors in the IAQ Management Plan. Include the Construction IAQ Management Plan requirements in contract agreements with Subcontractors. Familiarize Subcontractors with the Construction IAQ Management Plan and how the Construction IAQ Management Plan will affect their daily activities. Hold a Subcontractors' orientation meeting to review the Construction IAQ Management Plan requirements.
- B. Responsibility of Subcontractors: Subcontractors for this Project will be responsible for cooperating with the Contractor in the preparation and implementation of the Construction IAQ Management Plan.



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- C. Include construction IAQ progress check-ins as a regular item in weekly Subcontractor meetings and safety meetings. Provide a copy of the plan on site, posted in an easily accessible area.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 19



**SECTION 01 91 13
GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 91 13

PART I – GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. The OPR and BOD documents are included by reference for information only.
- C. The Commissioning Plan, prepared by the Commissioning Agent (CxA) under separate contract with the City of New York, contains requirements that apply to this section.

1.2 SUMMARY:

- A. This section includes general requirements that apply to implementation of Commissioning without regard to systems, subsystems and equipment being commissioned. General Requirements for building enclosure commissioning are addressed in a separate specification.
- B. This Section includes:
 - 1. Definitions
 - 2. Commissioning Team
 - 3. City’s Responsibilities
 - 4. Contractor’s Responsibilities
 - 5. CxA Responsibilities
 - 6. Commissioning Documentation
 - 7. Submittals
 - 8. Coordination
 - 9. Execution

1.3 RELATED SECTIONS:

- A. System-Specific Commissioning requirements indicated in other sections of the Project Specifications for specific requirements for commissioning systems.
- B. This Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED procedures, and specific commissioning requirements of the Project Specifications, whichever is more stringent. The Contractor must cooperate with the CxA and provide whatever assistance is required.
- C. Related sections include, without limitation, the following:
 - 1. Section 01 10 00 SUMMARY
 - 2. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
 - 3. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
 - 4. Section 01 78 39 CONTRACT RECORD DOCUMENTS
 - 5. Section 01 79 00 DEMONSTRATION AND OWNER’S PRE-ACCEPTANCE ORIENTATION
 - 6. Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS
 - 7. Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS
 - 8. Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE



1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Basis of Design (BOD)	A document, prepared by the Design Consultant, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
Checklists	Forms that outline the step-by-step process that must be executed to fulfill the test requirements and to verify that materials, equipment, assemblies and systems are installed in accordance with the Contract Documents. The CxA must develop the checklists; the Contractor must complete them.
Commissioning	Commissioning is a systematic process of ensuring and documenting that the building systems have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The process does not eliminate or reduce the responsibility of the installing subcontractors to provide a finished product.
Commissioning Agent (Aka Commissioning Authority) (CxA)	Consultant under separate contract with the City of New York to provide Commissioning services for this Project. The CxA must not be an employee of the Contractor, nor will the CxA have any interest in the Contract.
Commissioning Plan	A document developed by the CxA that outlines the organization, schedule, roles and responsibilities, allocation of resources, and documentation requirements of the commissioning process.
Deferred Performance Tests	Performance tests that are performed, at the discretion of the CxA, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and Specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Factory Testing	Testing of equipment on-site or at the factory, by factory personnel, with or without the City’s representative.
Functional Performance Test (FPT)	Functional performance testing includes the dynamic functions and operations of equipment and systems using manual or monitoring methods under various levels of operation. Systems are tested under various modes, such as during low cooling loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarms, power failure, etc. The systems are run through all the control system’s sequences of operation and components are verified to respond as the sequences state. Such tests must be performed as per the protocol written by the CxA which defines the methods, personnel and expectations.
Issue (or Deficiency)	A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents.



Issues Log	A formal and ongoing record of problems, deficiencies or concerns that have been raised by members of the Commissioning Team during the course of commissioning. The Issues Log is the primary tracking tool to address all Commissioning Issues by concerned parties. All Issues must be addressed and resolved by the concerned parties before the closeout of the Project. This log tracks the resolution performed and date of closure of each Issue.
Master Equipment List (MEL)	A complete listing of all commissioned building equipment, including details such as make, model, location, ID Tag number, etc. that is taken from submittals and is the basis from which checklists will be generated. The MEL is a spreadsheet which is also used as a tracking tool for all milestones of the commissioning process, such as the creation and performance of checklists, startup of equipment, TAB work, etc.
Monitoring	The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.
Owner (City of New York) Contracted Tests	Tests paid for by the City of New York outside of the Contractor's Contract and for which the CxA does not provide oversight. These tests will not be repeated during functional testing if properly documented.
Owner's Project Requirements (OPR)	A document, prepared by the Design Consultant that details the functional requirements of a Project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
Pre-functional (Installation) Checklists	A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Contractor. Installation checklists are primarily static inspections and procedures to prepare equipment or systems for initial operation. Pre-functional (Installation) checklists augment, and are combined with, the manufacturer's startup checklist. The Checklists are filled out by the Contractor and reviewed by the CxA.
Sampling	Functional testing for a percentage of the total number of identical or near-identical pieces of equipment.
Seasonal Performance Tests	Functional tests that are deferred until, or performed again when, the system(s) will experience climate conditions close to their design conditions.
Startup	The initial starting or activating of equipment, including executing construction checklists.
Systems, Subsystems, Equipment, and Components	Where these terms are used together or separately, they mean "as-built" systems, subsystems, equipment, and components.
Systems Manual	A system-focused composite document that includes the Operation and Maintenance Manual, and additional information of use to the owner during the occupancy and operations phase.
Testing, Adjusting and Balancing (TAB)	Testing, adjusting, and balancing of the Heating Hot Water (HHW), Chilled Water (CHW) and Heating, Cooling, and Ventilation Airflow distribution system flows and pressures as specified in Contract Documents by a subcontractor certified to perform such work.
Test Requirements	Requirements specifying what modes and functions, etc. must be tested on any given piece of equipment or any given system (integrated or standalone). The test requirements are not the detailed test procedures. The test requirements for each system are specified in the respective Contract Documents.



Trending	Monitoring using the building controls system, and analysis of the data gathered over a period of time.
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1.5 COMMISSIONING TEAM:

- A. Members Appointed by the Contractor and its Subcontractors: Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the Commissioning process through coordinated actions. The Commissioning Team will consist of, but not be limited to, representatives of the Contractor, including Project superintendent and Subcontractors, installers, suppliers and specialists deemed appropriate by the CxA.
- B. Members Appointed by the City:
 - 1. Commissioning Authority/Agent (CxA): The designated person, company, or entity under separate Contract with the City that plans, schedules and coordinates the Commissioning Team to implement the commissioning process.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - 3. Design Consultant and other concerned entities.

1.6 CITY’S RESPONSIBILITIES:

- A. Provide the OPR and BOD documentation to the CxA for use in developing the Commissioning Plan; systems manual; operation and maintenance orientation plan; and testing plans and checklists.
- B. Assign operation and maintenance personnel to participate in Commissioning Team activities.
- C. Provide full details and results of any Owner- contracted tests relevant to the current Project.

1.7 CONTRACTOR’S RESPONSIBILITIES:

- A. The Contractor must provide utility services required for the commissioning process.
- B. As a member of the Commissioning Team, the Contractor and Subcontractors must assign representatives with expertise and authority to act on behalf of the Contractor and its Subcontractor and schedule them to participate in and perform Commissioning Team activities including, but not limited to, the following:
 - 1. Participate in scheduled construction-phase coordination and Commissioning Team meetings.
 - 2. Integrate and coordinate commissioning process activities with the construction schedule.
 - 3. Provide all factory acceptance test reports to the CxA through the Commissioner.
 - 4. Respond to any additional specific information requests from the CxA. CxA may request additional documentation necessary for the commissioning process. Requests by CxA may precede, be concurrent with, or follow normal submittals.
 - 5. Ensure the cooperation and participation of all Subcontractors and manufacturers of equipment to be commissioned.
 - 6. Verify and confirm that components, equipment, and system are functioning as per design prior to CxA witnessing testing.
 - 7. Perform testing required in the Commissioning schedule as per the Commissioning process test procedures provided by the CxA, providing no less than 48 hours’ notice to the CxA through the Commissioner.
 - 8. Complete installation checklists as Work is completed and return to CxA through the Commissioner.



9. Provide written responses to the CxA through the Commissioner for resolution of Issues recorded in the Issues Log within five (5) business days.
10. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
11. Submit operation and maintenance manuals for systems and subsystems, and equipment in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS. Such documents must be submitted prior to functional testing.
12. Submit As-Built documents in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
13. Provide orientation sessions for operations and maintenance personnel (sessions will be witnessed by the CxA) in accordance with Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION. Provide no less than 48 hours' notice to the CxA, through the Commissioner. Video record and edit orientation sessions and provide an electronic recording to the CxA and Commissioner no later than two (2) weeks after the orientation session occurs. Edit as requested by the Commissioner.

1.8 COMMISSIONING AGENT'S (CxA) RESPONSIBILITIES:

- A. Organize and lead the Commissioning Team.
- B. Prepare a construction-phase Commissioning Plan. Collaborate through the Commissioner with each Contractor and with Subcontractors to develop test and inspection procedures. Include design changes and coordinate Commissioning activities with the overall Project schedule. Identify Commissioning Team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task. Update the Commissioning Plan during construction as required.
- C. Review and comment in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, on submittals from the Contractor for compliance with the OPR, BOD, Contract Documents, and construction-phase Commissioning Plan. Review and comment on performance expectations of systems and equipment and interface between systems relating to the OPR and BOD.
- D. Coordinate with the Commissioner, in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION, to convene Commissioning Team meetings for the purpose of coordination, communication and conflict resolution; discuss progress of the commissioning processes.
- E. At the beginning of the construction phase, coordinate with the Commissioner's kick-off meeting schedule to conduct an initial construction-phase coordination meeting for the purpose of reviewing the Commissioning activities and establishing tentative schedules for operation and maintenance submittals, operation and maintenance orientation sessions, TAB Work, testing, and Project completion.
- F. Perform site visits to observe and inspect construction as described in the Commissioning Plan. Report progress and deficiencies to the Commissioner. In addition to compliance with the OPR, BOD, and Contract Documents, inspect systems and equipment installation for adequate accessibility required for component maintenance replacement and repair.
- G. Prepare and distribute project-specific test and inspection procedures and checklists and maintain MEL.
- H. Verify air and water systems balancing by sampling, reviewing completed reports and selected site observation. Coordinate submittal reviews with the Commissioner so that the comments are combined into a single review and submitted to the Contractor.
- I. Coordinate with the Commissioner to witness and document tests, inspections and systems startup, as per the Commissioning Plan.



- J. Maintain an Issues Log and a record of functional testing. Report all Issues as they occur to the Commissioner.
- K. Compile test data, inspection reports and certificates, and include them in the systems manual and Commissioning Report.
- L. Certify date of acceptance and startup for each item of equipment for start of warranty periods.
- M. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BOD, and Contract Documents. Operation and maintenance documentation requirements are specified in other sections of the Project Specifications and described in Section 01 78 39 CONTRACT RECORD DOCUMENTS.
- N. Review agenda for orientation; witness and confirm orientation session conforms with agenda and Contract Documents; review recording of demonstration and orientation sessions provided by the Contractor on USB drive or other electronic media as requested by the Commissioner and provide appropriate comments for editing.
- O. Return to the site ten (10) months into the twelve (12)-month guaranty period, to review with facility staff the current building operation and the condition of outstanding Issues related to the original and seasonal commissioning. Interview facility staff and identify problems or concerns they have with operating the building as originally intended.
- P. Prepare Commissioning Reports.
- Q. Assemble the final commissioning documentation, including the Commissioning Report and Systems Manual.
- R. Perform all CxA tasks as defined by LEED and the NYC Energy Conservation Code; prepare LEED submittal documents and preliminary and final Commissioning Reports as required by the NYC Energy Conservation Code.

1.9 COMMISSIONING DOCUMENTATION:

The Contractor must assist the CxA in the development and compiling of the following Commissioning Documentation:

- A. Index of Commissioning Documents: The CxA will prepare an index including the storage location of each document.
- B. Commissioning Plan: A document prepared by the CxA that outlines the schedule, allocation of resources, roles and responsibilities, and documentation requirements of the Commissioning process.
- C. Test Checklists: The CxA will develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. The CxA will prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Space will be provided for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in other sections of the Project Specifications, but must include without limitation:
 - 1. Identification of tested item
 - 2. Date of test
 - 3. Indication of whether the record is for a first test or retest following correction of a problem or Issue
 - 4. Dated signatures of the person performing the test and of the witness if applicable
 - 5. Deficiencies and Issues, if any, generated as a result of the test



- D. Inspection Checklists will be signed by the Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing.
- E. Test and Inspection Reports: The CxA will record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application will be included with data. CxA must compile test and inspection reports and test and inspection certificates and include them in systems manual and Commissioning Report.
- F. Corrective Action Documents: The CxA will document corrective action taken for systems and equipment that fail tests and include required modifications to systems and equipment and revisions to test procedures, if any. The Contractor must retest systems and equipment requiring corrective action. The CxA will document retest results.
- G. Issues Log: The CxA will prepare and maintain an Issues Log that describes design, installation, and performance Issues that are at variance with the OPR, BOD, and Contract Documents. The log will identify and track Issues as they are encountered, documenting the status of unresolved and resolved Issues. The Issues Log will identify, at a minimum:
 - 1. The party responsible for correcting the Issue,
 - 2. The person documenting the Issue resolution,
 - 3. The exact location of the Issue (floor and room),
 - 4. The applicable system component,
 - 5. A detailed description of the Issue,
 - 6. The Issue status, and
 - 7. The date the Issue was discovered and the date the Issue was resolved.
- H. Commissioning Report: The CxA will document results of the commissioning process including unresolved Issues and performance of systems, subsystems, and equipment. The Commissioning Report will indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BOD, and Contract Documents. The Commissioning Report must include:
 - 1. An executive summary, including participants and their roles, a brief building description, an overview of the commissioning and testing scope, and a general description of testing and verification methods,
 - 2. Installation/Pre-Functional Checklists,
 - 3. Start-up reports,
 - 4. Functional Test documentation,
 - 5. Trend Log Analysis,
 - 6. The final Issues Log, with all Issues identified through the commissioning process, identifying which, if any, Issues remain unresolved,
 - 7. The Commissioning Plan,
 - 8. Commissioning progress and field reports,
 - 9. Commissioning review documents, and
 - 10. Record of owner's orientation.
- I. Systems Manual: The CxA will gather required information and compile systems manual as specified in other sections of the Project Specifications and described in Section 01 78 39 CONTRACT RECORD DOCUMENTS.



1.10 SUBMITTALS:

- A. Submittal of shop drawings, product data, samples, etc., relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 33 00 SUBMITTAL PROCEDURES.
- B. As-Built Contract Record Drawings and Operating and Maintenance Manuals relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
- C. All demonstration and orientation submittals relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 79 00 DEMONSTRATION AND OWNER'S PREACCEPTANCE ORIENTATION.
- D. Completed Prefunctional (Installation) Checklists must be provided to the CxA prior to equipment startup.

1.11 COORDINATION:

- A. Coordination of Commissioning is the responsibility of all Commissioning Team members.
- B. Coordinating Meetings: The CxA will coordinate with the Commissioner's regularly scheduled construction progress meetings to conduct coordination meetings of the Commissioning Team to review progress on the Commissioning Plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities. Commissioner and Contractor must ensure that all required Commissioning Team members attend.
- C. Construction Documents: The Contractor, through the Commissioner, will furnish copies of all construction documents, addenda, change orders and appropriate submittals and shop drawings to the CxA.
- D. Pre-testing Meetings: The CxA will coordinate with the Commissioner to conduct pretest meetings of the Commissioning Team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested. Commissioner and Contractor must ensure that all required Commissioning Team members attend.
- E. Testing Coordination: Contractor must coordinate schedule times with the Commissioning Team, through the Commissioner, for tests, inspections, obtaining samples, and similar activities. The CxA will advise the Commissioning Team as to the sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- F. Manufacturers' Field Services: The Contractor must coordinate manufacturers' field services, as per the Commissioning Plan.
- G. The CxA will regularly apprise the Commissioner of progress, pending problems and/or disputes, as well as provide regular status reports on progress with each system.

PART II – PRODUCTS

2.1 TEST EQUIPMENT

- A. All industry standard test equipment required for performing the specific tests must be provided by the Contractor responsible for testing. Any proprietary Vendor-specific test equipment must be provided by that Vendor or Manufacturer.
- B. Special equipment, tools, instruments, software, and equipment communication network access hardware and software (only available from Vendor, specific to the piece of equipment) required for testing equipment according to the Contract Documents must be included at no extra cost to the City and must be turned over



to the City at Project close-out, except for stand-alone data logging equipment that may be used by the CxA.

- C. Any portable or handheld setup and/or calibration devices required to initialize the control system must be made available by the control vendor for use by the CxA at no additional cost to the City.
- D. The instrumentation used in the commissioning process must comply with the following:
 - 1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required
 - 2. Be calibrated at the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument
 - 3. Be maintained in good repair and operating condition throughout use duration on this Project
 - 4. Be immediately recalibrated or repaired if dropped and/or damaged in any way during this Project.

PART III – EXECUTION

3.1 COMMISSIONING PROCESS

- A. The following provides an overview of the Commissioning tasks during Project construction and the general order in which they occur.
 - 1. Construction-phase Commissioning begins with a Commissioning Kickoff Meeting, conducted by the CxA through the Commissioner in accordance with section 01 31 00 PROJECT MANAGEMENT AND COORDINATION, where the Commissioning process is reviewed with all the Commissioning Team Members.
 - 2. Additional meetings may be required throughout construction, scheduled by the CxA through the Commissioner in accordance with 01 31 00 PROJECT MANAGEMENT AND COORDINATION with necessary parties attending, to plan, scope, coordinate and schedule future activities and resolve open Issues.
 - 3. The CxA will review the Contractor submittals concurrent with the Commissioner and provide comments to the Commissioner for inclusion in their review. The reviewed submittals will include all commissioned equipment information, including detailed startup procedures, and coordination drawings that include commissioned equipment and systems, control drawings and sequences, and interfaces and interlocks between systems.
 - 4. The CxA works with the Commissioner and Contractor in developing Pre-functional and Functional Test documentation formats.
 - 5. Periodically throughout the construction process, the CxA will perform site visits to observe component and system installations.
 - 6. The checkout and performance verification generally proceeds from component level to equipment to systems and intersystem levels. Pre-functional (Installation) Checklists are to be completed before equipment startup. Equipment startup must be completed before TAB. TAB must be completed before the Functional Performance Checklists.
 - 7. The Contractor must, with guidance from the CxA, execute and document the Pre-Functional (Installation) Checklists and perform startup and initial checkout of equipment and systems. The CxA documents that the checklists and startup are completed according to the approved plans. This will include the CxA witnessing selected assembly markups, portions of the startup of selected equipment, and spot checking the Pre-Functional (Installation) Checklists.
 - 8. The CxA develops specific equipment and system Functional Checklists. The Contractor receives a copy of the procedure through the Commissioner. The CxA may request additional design



narrative from the Commissioner and Controls Contractor, depending on the completeness of the Basis of Design and sequences provided within the design documents.

9. The Functional Checklists are executed by the Contractor and witnessed and documented by the CxA.
10. Items of non-compliance in material, installation startup, and operation are corrected and the equipment or system is rechecked. The CxA will maintain an Issues Log to track Issues and Issue resolution.
11. The CxA will review the Operation & Maintenance documentation for completeness.
12. Commissioning, excluding the Warranty Walkthrough and any seasonal testing at the written direction of the Commissioner, must be completed prior to Substantial Completion.
13. The CxA reviews the orientation documentation. The orientation schedules and agenda are provided by the subcontractors. The CxA verifies that orientation is completed, attended by the appropriate City of New York personnel, is thorough and provides all necessary information required to operate and service the equipment or system.
14. Deferred testing/checkouts are conducted, as specified or required in the Contract Documents.

3.2 COMMISSIONING PLAN AND SCHEDULE

- A. Commissioning Plan: The Commissioning Plan provides guidance in the execution of the commissioning process. After the initial construction phase Commissioning kickoff meeting, the CxA will update the plan. This plan is a living document that must evolve and expand as the Project progresses. The Commissioning Plan must include:
 1. Description of the facility and Project.
 2. Description of the commissioning process and associated deliverable documents.
 3. Description of equipment and systems to be commissioned.
 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 5. Sample rates for equipment to be tested.
 6. Identification of task items that must be completed before the next operation can proceed.
 7. Description of responsibilities of Commissioning Team members.
 8. Description of observations to be made and reported on during testing and witnessing of testing by all parties involved in the Project.
- B. Commissioning Schedule: Contractor must provide construction schedules to the CxA, in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION. The CxA will develop and submit a schedule identifying the commissioning process and provide commissioning scheduling information to the Commissioner and Contractor for review and planning activities. The Contractor must incorporate the CxA's activities into the Project schedule.

3.3 TESTING PROCEDURES

- A. The CxA will determine and document the acceptance procedures for each system within disciplines. The acceptance procedures must incorporate the commissioning standards and successful testing results as referred to throughout the Specifications.



- B. The CxA will provide performance checklists and performance checkout data sheets for each system based on actual system configuration. Special emphasis must be placed on checkout procedures that must conclusively determine actual system performance and compliance with the OPR and BoD.
- C. The Contractor and appropriate Vendor(s) must be informed of what tests are to be performed and the expected results. The Commissioning Plan must address the test requirements and be distributed to all parties involved with that system.
- D. Prior to Functional Testing, the Contractor must provide the following:
 - 1. Contractor must certify in writing that commissioned systems, subsystems, and equipment have been installed, calibrated and started, and are operating according to the Contract Documents.
 - 2. Contractor must certify in writing that all relevant instrumentation and control systems have been completed and calibrated; are operating according to the Contract Documents; and that pretest set points have been recorded.
 - 3. Contractor must certify in writing that TAB procedures have been completed, and that the TAB report has been submitted, discrepancies corrected, and corrective work approved.
 - 4. Contractor must perform tests for system and intersystem performance only after CxA and Commissioner have approved the completed testing checklists for systems, subsystems, and equipment.
- E. The Functional Performance tests must be performed by the Contractor and Vendor(s) with oversight by the CxA. The CxA must witness, verify, and document these tests.
 - 1. Functional Performance Tests must include operating the systems and components through each of the written sequences of operation, other significant modes of miscellaneous alarms, power failure, and security alarm when impacted by and interlocked with commissioned equipment, as detailed in the Commissioning Plan.
 - 2. Checklists must be completed comprehensively and to the extent necessary to enable the CxA to assure the Commissioner that the systems perform as per the OPR, BOD, and Contract Documents.
 - 3. If a test is failed for any reason and retesting is required, the Contractor must provide retesting at no additional cost to the City.
 - 4. If a test must be witnessed more than twice by the Commissioning Agent due to repeated failure to perform as per the design documents, the Contractor must be responsible for the Commissioning Agent's fee for witnessing repeated tests beyond the second incidence. Such fee will be negotiated between the Commissioning Agent and the Commissioner.
 - 5. After testing, Contractor must return settings to normal operating conditions.

3.4 OPERATION & MAINTENANCE MANUALS

- A. General
 - 1. The CxA must review the Operation & Maintenance manuals provided by the Contractor for completeness of the document. The review process will verify that Operation & Maintenance instructions meet Specifications and are included for all commissioned equipment furnished by the Contractor.
 - 2. Published literature will be specifically oriented to the provided equipment, indicating required operation and maintenance procedures, parts lists, assembly / disassembly diagrams and related information.



3. The Contractor must incorporate the standard technical literature into system-specific formats for this facility as designed and as actually installed. The resulting Operation & Maintenance information must be system-specific, concise, to the point and tailored specifically to this facility. The CxA must review these documents as necessary for final corrections by the Contractor.
 4. Contractor must submit Operations & Maintenance Manuals for each piece of equipment for review no later than 45 days after submittal approval.
- B. The Operation & Maintenance Manual review and coordination efforts must be completed prior to Owner orientation sessions, as these documents are to be utilized in the orientation sessions.
- C. System Operations Manual
1. The CxA must prepare and deliver these documents with inputs from the Contractor. The Contractor must provide all required documents to the CxA, through the Commissioner. The required documents must be described in the Commissioning Plan and Contract Documents. Typically, the manual includes the following:
 - a. System, subsystem, and equipment descriptions
 - b. Commissioned systems single line diagrams (to be provided by Mechanical, Electrical, Plumbing, and Building Management System (BMS) subcontractors).
 - c. As built sequences of operations, control drawings and original set points (to be provided by Design Consultant and BMS subcontractor).
 - d. Operating instructions for integrated building systems (to be provided by Mechanical and BMS subcontractors).
 - e. Recommended schedule of maintenance requirements and frequency (to be provided by subcontractors).
 - f. Recommended schedule for calibrating sensors and actuators (to be provided by BMS subcontractor).

3.5 DEMONSTRATION AND INSTRUCTION

- A. The Contractor must schedule and coordinate instruction sessions for the facility's staff for each commissioned system. Demonstrations must be held per Contract Documents, along with the appropriate schematics, handouts and visual / audio orientation aids onsite with equipment.
- B. The equipment vendors must provide instruction on the specifics of each major equipment item including philosophy, troubleshooting and repair techniques.
- C. The Contractor must record and edit demonstration and orientation sessions, and provide these records to the CxA, through the Commissioner.
- D. For additional direction pertinent to instruction, refer to other specific divisions for demonstration and instruction requirements.

3.6 WARRANTY REVIEW / SEASONAL TESTING

- A. The CxA will return upon the start of the new season (cooling or heating) after Project completion to conduct performance tests that could not be performed due to ambient conditions. The seasonal testing will only be performed if suitable loads / conditions were unavailable during the performance testing stages (in other words; the requirement for testing is warranted), and at the written direction of the Commissioner.
- B. The CxA will return to the site approximately ten (10) months into the twelve (12)-month guaranty period and interview the occupants and maintenance staff, review the operation of the building, provide recommendations for installation and operational problems and document warranty and operational Issues in the Issues database.



3.7 RECORD DRAWINGS

- A. The CxA must review the as built Contract Documents to verify incorporation of both design changes and as-built construction details. Discrepancies noted must be corrected by the appropriate party.

END OF SECTION 01 91 13



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

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**SECTION 01 91 15
GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE**

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 91 15

PART I – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. The Owner's Project Requirements (OPR) and Basis of Design (BOD) documents are included by reference for information only.
- C. The Commissioning Plan, prepared by the Commissioning Agent (CxA) under separate contract with the City of New York, contains requirements that apply to this section.

1.2 SECTION INCLUDES

- A. This section includes the commissioning requirements for the Building Enclosure systems. Refer to "Exterior Enclosure Commissioning" in other sections of the Project Specifications for specific requirements regarding Building Enclosure Commissioning.
 - 1. The commissioning requirements for the Building Enclosure systems given in this section are entirely separate from, and in addition to, the Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for this Project. The Contractor, and his/her Suppliers, Subcontractors, Vendors, etc., are required to participate in both commissioning processes as required.

1.3 DESCRIPTION

- A. Building Enclosure Commissioning (BECx) is a systematic process of ensuring all building enclosure systems responsible for environmental separation perform as per the OPR and BOD. The BECx process is intended to verify and document proper installation and performance of building enclosure materials and systems in accordance with the Contract Documents.
- B. Commissioning does not take away from, or reduce, the Contractor's responsibility to provide a finished and fully functioning product and installation.
- C. This section will in no way diminish the responsibility of the Contractor in performing all aspects of work and testing as outlined in the Contract Documents. Any requirements outlined in this section are in addition to requirements outlined in the Contract Drawings and Specifications.

1.4 RELATED WORK

- A. Specific BECx requirements are given in this Section. The following Project Specification sections are related to the commissioning work specified in this section:
 - 1. Basic Concrete Requirements: Refer to Division 03
 - 2. Basic Metal Requirements: Refer to Division 05
 - 3. Basic Waterproofing, Roofing, Air Barrier and Insulation Requirements: Refer to Division 07
 - 4. Basic Fenestrations Requirements: Refer to Division 08
 - 5. Basic Finishing Requirements: Refer to Division 09



1.5 DEFINITIONS AND ABBREVIATIONS

A. Refer to Article 2 of the Contract and Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for terms, words, and expressions not otherwise defined herein.

Approval	Acceptance that a material or system has been properly installed and is functioning in tested modes according to the Contract Documents.
Building Enclosure Commissioning Agent (BECA)	BECA directs and coordinates day-to-day BECx commissioning activities.
Building Enclosure Testing Agency (BETA)	Building Enclosure Testing Agency whom is an independent agency retained by the Contractor and approved by the Commissioner, fully accredited by the appropriate governing body for each of the materials, components or systems to be tested or evaluated for compliance with requirements of the Contract Documents and as directed by the BECA. Documentation of such certification must be submitted to and approved by the Commissioner prior to the start of any work by the BETA.
Commissioning	Commissioning is a systematic process of ensuring and documenting that the building systems have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent, and have documentation to support proper installation and operation. The process does not eliminate or reduce the responsibility of the installing subcontractors to provide a finished product.
Commissioning Agent (CxA)	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Commissioning Plan	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Deficiency	Condition of a building enclosure material or system that is not in compliance with Contract Documents (that is, does not perform properly or does not comply with design intent).
Design Consultant	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Simulated Condition	Condition created for testing component or system (e.g., applying pressure differential across the building enclosure concurrent with water spray to simulate a wind driven rain).
Mock-up	The activities where systems or materials are initially constructed and tested.

1.6 COORDINATION

A. Building Enclosure Commissioning Team: Members of the Building Enclosure Commissioning Team will consist of:

1. CxA
2. BECA
3. BETA
4. Commissioner
5. Contractor, and all Building Enclosure Subcontractors
6. Design Consultant

B. Management: City of New York will contract services of the BECA through a separate contract. The BECA will direct and coordinate commissioning activities and report to the Commissioner. All members of the



Building Enclosure Commissioning Team must cooperate to fulfill contracted responsibilities and objectives of the Contract Documents.

- C. Scheduling: BECA must work with the Building Enclosure Commissioning Team to establish required commissioning activities to incorporate into the preliminary commissioning schedule. The Contractor must integrate commissioning activities into master construction schedule, in accordance with Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION. Necessary notifications are to be made in a timely manner in order to expedite commissioning.

1.7 SUBMITTALS

- A. Contractor must provide documentation required for commissioning work in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. At minimum, documentation must include, but not be limited to:
1. Submittal of shop drawings, product data, samples, etc., relevant to BECx and as requested by the BECA. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 2. As-Built Record Drawings and Operation and Maintenance Information relevant to BECx and as required by the BECA. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 3. All demonstration and orientation submittals relevant to BECx and as requested by the BECA. Such submittals must be in compliance with Section 01 79 00 DEMONSTRATION AND OWNER'S PREACCEPTANCE ORIENTATION.
 4. Performance data, any performance test procedures, and installation and checkout materials.
- B. The Contractor must provide all submittals to the Design Consultant, as per Section 01 33 00 SUBMITTAL PROCEDURES. The Design Consultant will transmit all building enclosure related submittals to the BECA for concurrent review.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 SYSTEMS TO BE COMMISSIONED

- A. Building Enclosure systems to be commissioned may include, but are not limited to, Roof waterproofing, including garden roof systems, all penetrations, and transitions; skylights and other sloped glazing; exterior walls, including the air barrier system, water management systems, and thermal insulation; punched windows, window walls, curtain walls, storefronts, glazed entries, doors, and louvers; sealants, expansion joints, and control joints; flashings, including all transitions and end-dams; terrace, balcony, and deck waterproofing; below-grade waterproofing, including drainage, waterproofing and damp proofing; below slab floor barriers; interface and transition conditions between exterior enclosure components and systems; smoke controls and fire separation and stopping; and any other special building enclosure systems, equipment, and controls. Refer to the Contract Documents for clarity.

3.2 RESPONSIBILITIES OF COMMISSIONING TEAM MEMBERS DURING CONSTRUCTION PHASE

- A. Responsibilities of the Design Consultant include without limitation the following:
1. Review BECA comments on construction documents and shop drawings.
 2. Assist in dispute resolution regarding building enclosure items.
 3. Review BECA reports.
 4. Incorporate BECA Submittal Review Comments into response on submittals.
- B. Responsibilities of the BECA include the following without limitation:



1. Review and comment on Mock-up construction and testing plan as provided by Contractor.
 2. Development of BECx Plan.
 3. Review of building enclosure shop drawings and submittals, including “approved equal” requests, through the Commissioner in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
 4. Attend combined pre-construction and BECx kick-off meeting.
 5. Develop construction checklists for the building enclosure for the Contractor’s use.
 6. Observe the construction of a building enclosure Mock-up.
 7. Witness the testing of a building enclosure Mock-up.
 8. Project meetings / conference calls / coordination.
 9. Field monitor installation of exterior enclosure components.
 10. Update field report log.
 11. Update BECx Plan.
 12. Advise on Requests for Information.
 13. Assist with the preparation of LEED paperwork.
 14. Prepare systems manual, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 15. Complete Maintenance Plan, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 16. Prepare training manual, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
 17. Prepare final BECx record and enclosure commissioning close-out documents.
 18. Develop on-going BECx Plan.
- C. Responsibilities of the Contractor and Building Enclosure Subcontractors include without limitation the following:
1. Review BECx Plan and FPT specification.
 2. Attend commissioning kick-off meeting and other Building Enclosure Commissioning Team meetings.
 3. Incorporate commissioning activities into the construction schedule.
 4. Periodically update Commissioning activities in the construction schedule.
 5. Notify Commissioner and BECA of work completion.
 6. Verify building enclosure materials and assemblies are ready for functional testing.
 7. Retain the services of an approved independent BETA; submit qualifications of independent BETA to Commissioner for approval; coordinate all activities and deliverables of this BETA; ensure all BETA deliverables are provided to the Building Enclosure Commissioning Team.
 8. Attend all required material and systems testing.
 9. Execute all periodic maintenance or repairs required on started systems from initial Mock-up of equipment to Final Acceptance by Commissioner to prevent material warranties from being voided.
 10. Submit maintenance logs of all interim maintenance or repair tasks performed by Contractor.



11. Ensure installation work is complete, is in compliance with Contract Documents, and is ready for Functional Performance Testing. FPT test results will be documented by BECA.
 12. Ensure resolution of non-compliance and deficiencies in construction or test results. Obtain written documentation of completion from the appropriate subcontractors.
 13. Provide letters of compatibility for adjacent building enclosure materials and assemblies.
 14. Facilitate all repairs and retesting of failed condition at no additional cost to the City of New York.
 15. Provide all warranty information to BECA.
- D. Responsibilities of the BETA include without limitation the following:
1. Attend Commissioning kick-off meeting and other Building Enclosure Commissioning Team meetings.
 2. Provide on-site technician and equipment to complete Mock-up and field Functional Performance Testing.
 3. Prepare and submit reports to the Commissioner at the conclusion of all testing.
 4. Perform retesting and prepare corresponding reports.

3.3 BUILDING ENCLOSURE COMMISSIONING TEAM (BECx) MEETINGS

- A. BECx meetings will be held periodically, as determined by the Commissioner and recommended by BECA.
- B. Discussions held in BECx meetings must include, but not be limited to: system/materials, mock-up/field, progress, scheduling, testing, documentation, deficiencies, and problem resolution.
- C. The Contractor must attend BECx meetings, and must ensure the attendance of required subcontractors, as requested.

3.4 REPORTING

- A. BECA will provide status reports to the Commissioner. The Commissioner will provide such status reports to the Contactor, CxA, Design Consultant, and other entities as needed.
- B. BECA will submit non-compliance and deficiency reports to Commissioner. The Commissioner will provide such reports to the Contractor, CxA, Design Consultant, and other entities as needed.
- C. BECA will provide a final summary report to Commissioner and CxA.

3.5 MOCK-UP AND FINAL CONSTRUCTION

- A. Prior to Functional Performance Testing or concealment of functional performance layers within the building enclosure, the Contractor must verify that all assemblies are complete, including deficiency long items, and all Contract requirements are met.

3.6 FUNCTIONAL PERFORMANCE TESTING

- A. Objectives and Scope
 1. The objective of Functional Performance Testing is to demonstrate that the building enclosure is performing according to documented design intent and Contract Documents. Functional Performance Testing ensures and documents that the building enclosure systems are fully operational. Additionally, during Functional Performance Testing, areas of deficient performance are identified and corrected, improving building enclosure system performance.
- B. Development of Test Procedures



1. The purpose of a specific test is to verify and document compliance of the installed enclosure systems with the OPR. Building Enclosure Functional Performance Test Protocols are provided in other sections of the Project Specifications for specific requirements regarding BECx.

C. Coordination and Scheduling

1. Contractor must provide sufficient notice to BECA, through the Commissioner, regarding completion schedule for materials and systems. Testing to be performed in conjunction with site visits. Contractor must schedule Functional Performance Tests with Commissioning Team. BECA must witness and document functional testing of equipment and systems. BETA, as retained by the Contractor, must execute tests under direction of BECA.
2. Successful completion of Mock-up functional performance testing must occur prior to full production installation of building enclosure materials and systems.

3.7 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation

1. BECA must witness and document results of FPT.

B. Non-Conformance

1. BECA must record results of functional testing. Deficiency or non-conformance issues must be noted and reported to the Commissioner. The Commissioner must provide such non-conformance reports to the CxA, Design Consultant, Contractor, and other entities, as needed.
2. Corrections of minor deficiencies identified may be made during tests at the discretion of the Commissioner and as recommended by the BECA. In such cases, deficiency and resolution must be documented.
3. Every effort must be made to expedite testing and minimize unnecessary delays, while not compromising integrity of tests.
4. Deficiencies are handled in the following manner:
 - a) BECA documents deficiencies and notes Contractor's response and intentions. A finding of deficiency will not end the testing process.
 - b) BECA submits deficiency report to the Commissioner. The Commissioner will provide such deficiency report to the CxA, Contractor, Design Consultant, and other entities as required.
 - c) Contractor corrects deficiency and certifies that material or assembly is ready to be retested.
 - d) Contractor informs Commissioner of retesting schedule for coordination with the BECA.
 - e) Contractor reschedules test with the Commissioner and BETA at no additional cost to the City of New York.
 - f) If a test must be witnessed more than twice by the BECA due to repeated failure to perform as per the design documents, the Contractor must be responsible for the BECA's fee for witnessing repeated tests beyond the second incidence. Such fee will be negotiated between the BECA and the Commissioner.

C. Testing

1. Costs for all testing and retesting required for the Project will be the responsibility of the Contractor. The Contractor is to provide access to the test specimens to the Commissioning Team, through the Commissioner.



3.8 COMMISSIONING DOCUMENTATION

A. Final Report Details

1. Final BECx Report must include an executive summary, list of participants and roles, brief building description, overview of Commissioning and testing scope, and general description of testing and verification methods. Report must contain evaluation regarding:
 - a) Conformance to Specifications and design intent.
 - b) Material/system installation.
 - c) Functional performance.
2. All outstanding non-compliance items must be specifically listed.
3. Recommendations for improvement to system or operations, future actions, etc. must also be listed.

END OF SECTION 01 91 15



**Department of
Design and
Construction**

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date: July 1, 2022

(No Text on This Page)

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc



**Department of
Design and
Construction**

Contract for Furnishing all Labor and Material Necessary

Contractor

Dated _____, 20____

Approved as to Form
Certified as to Legal Authority

Acting Corporation Counsel

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____



FMS ID: **SANDBOMB**



**Department of
Design and
Construction**

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

NYPD Bomb Squad Building

**LOCATION: 100A Rodman's Neck Path, Pelham Bay Park
BOROUGH: Bronx, NY 10464
CITY OF NEW YORK**

Contractor

Dated _____, 20____

Approved as to Form
Certified as to Legal Authority

Acting Corporation Counsel

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____





**Department of
Design and
Construction**

PROJECT ID:

SANDBOMB

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000
WEBSITE www.nyc.gov/buildnyc

VOLUME 3 OF 3

**ADDENDUM TO THE GENERAL
CONDITIONS**

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

NYPD Bomb Squad Building

**LOCATION:
BOROUGH:
CITY OF NEW YORK**

**100A Rodman's Neck Path, Pelham Bay Park
Bronx, NY 10464**

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

NYPD Bomb Squad Building

Rice-Lipka Architects

Date: October 11, 2022



THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

January 17, 2023

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for January 26, 2023, at 2:30 pm is rescheduled to February 16, 2023 at 2:30 pm.**
Contract #1 – General Construction Work
2. **Bidders Questions and Responses to Questions:**
See Attachment A.
3. **Revisions to Documents:**
See Attachment B.
4. **Revisions to PASSPort forms:**
See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled “Transferring Data Between Rounds of an RFX” has been added to the Documents section of the View RFX tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidder's Question	DDC Response
1.	The Site logistic plan DM100.00 see attached provided as part of Appendix indicate "Existing building to be Demoeed" in Frank Range area which will be the location of DDC/CM trailers please advise if this bldg. is to be demolished under this contract or by others?	Building F Frank is to be demolished under this contract.
2.	One of storage building prefab vendors is saying they are providing it direct to DDC. However, the contract drawings shows it as part of the scope. Please advise.	The Storage Building 8 is to be provided by the Contractor under this contract, not directly to DDC.
3.	Specification section 096723 "Resinous Flooring," lists Stonhard Stonclad GS with stonproof ME 7 & Stonkote GS4. The schedule only lists Stonhard Stonclad 3/16" thick. Please clarify. We will be pricing Dex-O-Tex as an approved equal system.	The contractor is to provide the basis-of-design product, Stonhard Stonclad GS with stonproof ME 7 & Stonkote GS4, or an approved equal as noted in Specification Section 096723, Article 2.1.
4.	Please provide the Planholder list in the Addenda as per pre-bid conference information.	The Planholder list is included with this Addendum.
5.	Architectural Drawing A880 is calling for windows W1 through W9 to be "Composite" and Specification section 085113 "Aluminum Windows" mentions "composite windows." However, the specified window is aluminum, all the details on the drawings are aluminum, and there is no description of these composite windows anywhere in the specifications. Please provide clarification into the "composite windows."	All windows are of aluminum construction. The word "composite" refers to the finish on the frame, not the frame material itself.
6.	Please confirm that a standard bid bond form is acceptable for the security of bid. No specific form was located.	Confirmed. The Bid Bond form for this project can be found in the PASSPort Questionnaire, Paper Bid Submissions – to be Submitted to the Agency, Bid Security Requirements.
7.	Please provide pre-bid meeting information if any.	The Pre-Bid Sign in sheet is included with this Addendum.

8.	We would like to bid as a manufacturer of the metal building enclosure. How would we obtain a list of first tier subcontractors that will be contracted to furnish and install the building enclosure?	This information can be found in the Planholder List, included with this Addendum.
9.	Will there be a bidders list posted for this procurement?	Yes. Refer to the Planholder List, included with this Addendum.
10.	Contract Drawing A103 "ROOF PLAN" calls for Finish Key "F – 3.0" which denotes for cast-in-place concrete floor exposed concrete with clear, non-yellowing, matte sealer. Please confirm if this is correct since all roof slab detail calls for decking and roofing finishes only, no concrete placements shown on roof level.	The roof plan is correct. The roof slab is to receive the clear, non-yellowing sealer as called for.
11.	Please confirm if all exposed structural steel (interior and exterior) shall either get painted or spray fireproofed.	The structural steel does not require fireproofing. All exposed steel is to be painted. Drawing G004 shows the fire rating of building elements based on the 2008 NYC Building Code. Structural frames are shown as having 0-hour rating.
12.	Is there a requirement that we use specific unions for this project? For example, in regard to the electrical work, do we have to use the Local 3 Union? We have a great relationship with a subcontractor that belongs to Local 339. Would it be acceptable to use them on this project?	This contract is subject to a Project Labor Agreement (PLA). Please refer to the PLA, and the PLA Frequently Asked Questions, both found in Volume 2.
13.	Does a Joint Venture (JV) have to be officially formed to submit this bid? If the JV does not have to be formed, is a letter of intent required or is it just the identification of the JV partner data entered in PASSPort?	The Joint Venture (JV) does not have to be formed in order to submit the bid. The bid may be submitted by one of the JV members on behalf of the JV. The PASSPort Questionnaire contains a "Joint Venture" section, which contains requirements for a Letter of Willingness from each JV member. If the bid is being submitted on behalf of a JV, regardless whether JV is already formed or its formation will depend on whether or not the JV is awarded the contract, the Letter of Willingness is required from each proposed JV member as part of the bid.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

- Planholder List is included with this Addendum.
- Pre-Bid Sign in sheet is included with this Addendum.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 1 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Changes:

The Bid Opening scheduled for January 26, 2023 at 2:30pm is rescheduled for February 16, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

February 6, 2023

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**
See Attachment A.
2. **Revisions to Documents:**
See Attachment B.
3. **Revisions to PASSPort forms:**
See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled “Transferring Data Between Rounds of an RFX” has been added to the Documents section of the View RFX tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

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If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidder's Question	DDC Response
1.	What is the size of the existing oil tank? (Is it the same fuel oil tank shown on drawing M-100.00).	The removal of the oil tank shown on drawing M100 is deleted from the contract and will be removed by DDC Tank Unit. See revised drawing M100.
2.	What type of product is in the existing holding tank?	The existing tank shown on drawing DM102 is an existing septic holding tank of approximately 600 gallons. It is to be removed under this contract.
3.	Specification 096723 "Resinous Flooring" calls out for Dex-O-tex ME Floor and Stonhard Stonclad GS, but the finish schedule only calls out for Stonhard Stonclad. Please confirm we can use Dex-o-tex ME Floor as per the specifications.	Contract may submit for approval Dex-O-Tex flooring, as listed in 096723 "Resinous Flooring," Article 2.1.
4.	Is the resinous flooring to go on the walls of House trap pit 58" deep as per plan A-101?	No.
5.	Please confirm no resinous flooring work on storage building #8, we did not find any.	No, no resinous flooring in Building 8.
6.	Please confirm no resinous flooring work on stair.	No.
7.	Please see our take off documents and confirm scope of work.	Scope of work must be determined by careful examination of the Contract Drawings and Specifications.
8.	What is the difference between F1.0 and F2.0? Is it just that one is smooth and one is textured finish? Please confirm which system is the basis of design for pricing.	See finish schedule as both are Basis of Design. F1.0 is a Smooth Epoxy resin finish and F2.0 is a Textured Epoxy resin finish.
9.	Section 28 14 00 - Access Control System Hardware - The security system specifications list all of the standard field devices and power supplies. However, there's no notes regarding the manufacturer of the Reader Controllers and Software Package. We're pretty sure NYPD uses "LENEN On guard" for their Access Control System reader controllers and software package, but we need in writing which model number of reader controllers and licensing information for the software package and	The project does not use an access control system. There are no card readers in the project, doors are electronically locked and released by the intercom system.

	card readers (Enterprise System linked to NYPD SOC or Stand-Alone)	
10.	Integrated Systems can provide turnkey installation including our CWA Union Cabling Subcontractor. Please advise if CWA Labor is permitted or should I be contacting the Local-3 Electrical Contractors and send them my “parts and smarts” security system proposals and be part of their Low Voltage Package with Security Systems, Fire Alarm, Telecom, and Audio Visual?	Contractor must use the PLA Unions.
11.	Integrated Systems field technicians will be responsible for the System Commissioning, Programming, and Final Testing after the initial security system rough-in scope of work is completed and all cabling and equipment is installed and terminated. Please advise if we should include Prevailing Wage/PW Labor Rates or will our standard Non-Union Labor Rates during Normal Business Hours are permitted?	Contractor must follow the PLA rates.
12.	What is the tax status for NYPD Bomb Squad - Capital Improvement or Tax Exempt?	This project is Tax Exempt.
13.	Genetec needs to know which type of Archiver/NVR Server for NYPD Bomb Squad - All-In-One - Server/workstation appliance without RAID5?	The video surveillance system is for live view only, no recording of video required as indicated in specification section 28 23 00(1.5)(B). Genetec workstation to be provided by the Contractor and not configured for recording.
14.	Genetec needs to know which type of Archiver/NVR Server for NYPD Bomb Squad - Separate server and workstation, with the server configured w/RAID5 for archiving drives.	The video surveillance system is for live view only, no recording of video required as indicated in specification section 28 23 00(1.5)(B).
15.	There’s a W2.0 at East elevation between col. 3 & 4 on A101M. there’s no W2.0 in windows schedule. Is that W2.1?	Window W2.0 is relabeled W2.1. Refer to updated Drawing A101M, included with this Addendum.
16.	Are there any specs for the aluminum doors #2.00 & #2.10	Door 2.00 is a flush aluminum door (similar to a flush hollow metal door), with vision panel as shown on the elevation. Door is to be provided by storefront manufacturer. Door 2.01 is hollow metal, not aluminum. Doors 2.00 and 2.10 are shown on drawing A860, Door Schedule and Types. Both are Type E, Door (Both types are shown on Door Types.) Refer to updated Drawing A860, included with this Addendum.
17.	What type of glass to infilled in doors type E & J?	1/4" tempered glass. Refer to updated Drawing A860, included with this Addendum.

18.	Spec 088100-10 calls for fire rated glazing. Where is it applied to?	There is no fire-rated glazing in the project. Refer to updated Specification Section 088100, included with this Addendum.
19.	Will the glass at lightwell to be laminated as per A880 or not laminated as per spec 088100-8?	The exterior pane (facing the stair) of the double-paned glazing is laminated glass as per section 088100. Refer to updated Drawing A880, included with this Addendum.
20.	Will Fireproofing be required for this project? If so where are the details and where is it on the drawings	No fireproofing is required.
21.	Drawing A602 detail 10 Lateral files are N.I.C. However, A941 has details for the lateral files. Are they part of this contract?	The lateral files shown on both drawings are not part of this contract. These files are incorporated into a millwork countertop and vertical uprights, which are in the contract.
22.	What the target U-Value - if it's .60 - neither the specified product nor the triple glazing is necessary.	Triple glazing shall be provided as detailed, regardless of U value.
23.	Will they accept modified operable sizes that we can build in the 2250i-XP - OR - will they accept a different Wausau series to accommodate the operable sizes as drawn - we can do it in our 3250i-XLT series.	This question to be resolved during the shop drawing and product literature submittal process. Refer to specification section 08 44 13 Glazed Aluminum Curtain Walls.
24.	What is the extent of Architectural Concrete as specified in Section 033300?	All visible concrete, inside and out, is to be Architectural Concrete as described and specified in section 033300.
25.	Structure on DM-101 is listed as, "Remove one story bldg. & foundations, arched MTL structure & plastic cover". Is this structure to be removed and disposed of or is it to be dismantled and stored for future reuse?	The structure is to be demolished and all remnants disposed of.
26.	On DM-102, note reads "Remove exg underground holding tank & associated piping (+-600 gal)". What was this holding tank used for (Septic, oil stormwater)?	This is a septic holding tank. Refer to Drawing DM-102, which describes the type of tank, its capacity and its contents.
27.	Please provide as-built drawings for Building F Frank area in order to quantify the demolition scope.	As-Built Drawings are unavailable and will not be included as part of this Contract.
28.	Section 3 on Drawing FO300 calls for 6" Gravel on the underside of the cast in place concrete slab and elevator pit. However, 'typical detail elevator pit' on Drawing S050 shows a 3" mud slab instead. Please clarify which is correct.	There is no mud slab under the elevator pit. Note has been removed. Refer to updated Drawing S050, included with this Addendum.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revisions to Bid Drawings:

Drawing DM102: Removed note about removal of existing oil tank.
Drawing A002: Removed diagram of existing oil tank.
Drawing A101M: Changed tag on east window from “W2.0” to “W2.1”.
Drawing A860: Added note about type of glazing for door types E and J.
Added note to “Notes” column in Door Schedule for door No.2.00.
Drawing A880: Added note re: laminated glass for windows W10, W12, W14 and W15.
Drawing M100: Removed note regarding removal of tanks. Added note that tanks will be removed by others.
Drawing S050: Removed extra note

Revisions to Volume 3:

08 81 00 Glass Glazing: Removed text describing fire-rated glass.

Revisions to Appendix:

Bomb Squad Logistics Plan Phase 1: Added notes for temporary fencing.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 2 of the procurement.
Please note that numbering of addenda is independent of rounds.

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

February 9, 2023

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**
See Attachment A.
2. **Revisions to Documents:**
See Attachment B.
3. **Revisions to PASSPort forms:**
See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled “Transferring Data Between Rounds of an RFX” has been added to the Documents section of the View RFX tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

DDC Response to Bidder's Questions in Addendum 2 are hereby revised as follows:

No.	Bidders Questions	DDC Revised Responses
11.	Integrated Systems field technicians will be responsible for the System Commissioning, Programming, and Final Testing after the initial security system rough-in scope of work is completed and all cabling and equipment is installed and terminated. Please advise if we should include Prevailing Wage/PW Labor Rates or will our standard Non-Union Labor Rates during Normal Business Hours are permitted?	Contractor must follow the PLA or applicable Prevailing Wage rate for this trade.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revisions to Planholder List:

SANDBOMB_Planholder List is updated as of 2/9/2023.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 3 of the procurement.
Please note that numbering of addenda is independent of rounds.

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

February 14, 2023

ADDENDUM No. # 4

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for February 16, 2023, at 2:30 pm is rescheduled to March 16, 2023 at 2:30 pm.**
Contract #1 – General Construction Work
2. **Bidders Questions and Responses to Questions:**
See Attachment A (Not Used).
3. **Revisions to Documents:**
See Attachment B (Not Used).
4. **Revisions to PASSPort forms:**
See Attachment C.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

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Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

NOT USED

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

NOT USED

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 3 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Changes:

The Bid Opening scheduled for February 16, 2023 at 2:30pm is rescheduled for March 16, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

March 14, 2023

ADDENDUM No. # 5

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for March 16, 2023, at 2:30 pm is rescheduled to March 28, 2023 at 2:30 pm.**
Contract #1 – General Construction Work
2. **Bidders Questions and Responses to Questions:**
See Attachment A
3. **Revisions to Documents:**
See Attachment B
4. **Revisions to PASSPort forms:**
See Attachment C

Transferring Data Between Rounds of an RFX: A new document titled “Transferring Data Between Rounds of an RFX” has been added to the Documents section of the View RFX tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Drawing DM100, Site Logistics Plan indicates that we are to relocate the existing flag poles. How many are there, can you provide the specification on the poles, (i.e. manufacturer, height, etc.), and where is the new location(s)? New foundations will need to be installed with the correct sleeve to match the pole.	There are no flagpole relocations shown on DM100. There are no flagpole relocations in this project.
2	We noticed that the scaled dimensions on Demolition Drawings DM101 and DM102 do not match and the Existing Bomb Squad Bldg Perimeter and Areas lead to different results when comparing them. Please clarify these discrepancies preferably by providing the As-Built Drawings.	Demolition Site Plan on Drawing DM101 is scaled 1/16" = 1'-0", as shown on the drawing title. Drawing DM102 is scaled at 1/8" = 1'-0", as shown on the drawing title.
3	Drawing E010 calls for 2-3 1/2" PVC conduits with 4-500mcm & 1-1/0 GRD.2" spare. Please advise where the remote annunciator and battery charging circuit go.	The battery charging outlet and block heater outlet were added due to the remote location and size of the generator. Outlets will be powered from base building panel. Remote annunciator for temporary generator is not required. Refer to updated Drawing E010, included with this Addendum, for clarification.
4	Please provide a specification for generator.	Generator is N.I.C. and not permanent. NYPD can utilize mobile generator from any manufacturer, provided it meets required capacity of 475 Amps, 208V, 3-Phase.
5	Please advise the location of the Generator Tap Box specification 263214.	Refer to drawing E010 for Generator tap box (docking station) location. Refer to updated Section 263214 included with this Addendum, for clarification.
6	Please confirm lightning protection is not required	Lightning Protection is not required.
7	Please provide specifications and details of the new 500kva transformer and secondary 120/208v shown on E301.	Transformer is shown on drawings ES002, ES100, E301 and described in Specification Section 261200.
8	Please advise if the 500 KVA transformer is Oil Filled or Dry Transformer.	It could be either.
9	Drawing E102 shows Hot water Heater on DP #5, whereas Drawing E401 calls for DP #8. Please confirm which is correct.	DP-8 is correct circuit number. Please note that switch for the EWH-1 in panel DP will be changed to 100/70A and feeder will be changed to 4#4, #6G, 1#8G in 1-1/4" conduit. Refer to updated Drawing E102, included with this Addendum.

10	Drawing E103 calls for 2- ACC-1 disconnect DP #8 & DP #9, whereas Drawing E401 DP #8 is Hot Water Heater and DP # 9 is Panel UP-CR. Please confirm which is correct.	Panel DP will be provided with two switches for ACC-1, each rated for 60/50A. ACC-1 will be provided with two feeders, each 3#6, #8G in 3/4" conduit. Circuits allocated for ACC-1 will be No. 5 and No. 10. Two 60A spare switches will be added to panel DP. Refer to updated Drawing E103, included with this Addendum.
11	Drawings E203 shows 3-N1, whereas Drawing A104 shows 5-N1. Please confirm which is correct.	Drawing A104 (Building 8 Reflective Ceiling Plan) shows (5) N0-1 fixtures. A104 is correct. Refer to updated Drawing E203, included with this Addendum.
12	Drawing E004 includes Fixture J1 exterior 13" floor recessed fixture. Where is this located? Please advise.	Fixture J1 is a drive-over recessed uplight. (2) fixtures have been added to drawing E201. Refer to updated Drawing E201 for this information.
13	Drawing A202 calls for 11- BTN Lights. Please provide the manufacturer and model number.	"BTN" does not refer to a fixture type. It is an abbreviation for the word "between."
14	Specification section 26 05 33-6 paragraph 4 calls for surface metal raceway, whereas paragraph 3 calls for EMT. Please confirm which is correct.	Both are correct. EMT is for concealed wiring. Rigid Galvanized Steel is for all exposed conduits. See notes on Drawings E101, E102, E201, and E202 for clarification.
15	For the vehicle exhaust duct, there is a note that it should be a minimum 14GA, but there is another one that states it should be 24GA. Please confirm which is correct.	14 GA. Refer to updated Specification section 233516, Article 2.16A, included with this Addendum, for this clarification.
16	Please advise the specified BMS vendor for this project.	The BMS vendor is not specified, but must adhere to all requirements noted within the Contract Documents, in particular, Specification section 230900.
17	On Drawing E301, there is a "K-link disconnect fused for 100A AT4160V" shown. Is there more information that can be provided on this disconnect? Or will this disconnect be provided by Con Edison and bidders do not need to include it?	No further information is available at this time. Bidders must bid on the fused disconnect.
18	Is there a fire alarm vendor currently on site in the adjacent buildings? If so, can you provide the contact information for that vendor?	There is no fire alarm vendor currently on site. Fire Alarm vendor must adhere to all requirements noted within the Contract Documents, in particular, section 284600.
19	Drawing ES101, near the light pole 'LP3' says "refer to duct bank Detail #7 on ES-200." That detail shows (4) 5" and (2) 4" conduits. Is this correct?	Detail 7/ES200 is correct.
20	Drawing ES200, Detail #4 shows both power and lighting in and out of the handhole. Are there separate circuits for the power and the lighting?	Yes.
21	Drawing ES002, Detail #1 shows feed to panel 'PB-8' as (1) 1 1/4". However, Drawing ES101 shows the feed as (1) 2" and (1) 2" spare. Please clarify.	Drawing ES101 is correct. Drawing ES002 does not show the feed to panel PB-8 as (1) 1 1/4". Drawing ES101 shows the correct feed sizes and types.

22	Drawing DM100 identifies a "security booth" at the construction entrance "to be coordinated by GC." Is the security booth and security guard both by the GC? If so, will the security guard only be required during construction operations, or around the clock?	This note has been removed. Refer to updated Drawing DM100, included with this Addendum.
23	HM doors & frames specification section 081113-4 identifies Type B frames not less than 14GA, but door schedule A860 identifies 12GA. frames? Please confirm we can use 14GA frames.	Gage of steel hollow metal frames is shown on Door Schedule, drawing A860. Refer to updated Specification Section 081113, included with this Addendum.
24	Details 1, 2, 3, 4 & 5 / A711 identify W12 on the walls, F4.0 on the floor and C5.0 ceilings. Please clarify as these are not on the finish key / plan.	Floors to be F9.0. Ceiling to be C9.0. Floor and ceiling tags have been updated. Refer to updated Drawing A711, included with this Addendum.
25	Please verify that the legend on Drawing L101 is showing the pattern backwards for the trench drain protection. Pattern is the opposite direction and different detail called out vs legend. These are also shown in the pattern of the legend, but assume this is a mistake, since outside lod & not trench drain	Direction of pattern at the actual trench to be protected is correct. Direction of pattern on legend is revised. Refer to updated Drawing L101, included with this Addendum.
26	Foundation Waterproofing specification 071300 calls for Preprufe 300R foundation waterproofing under slabs and horizontal surfaces and Preprufe 160R on vertical foundation surfaces, per Article 2.1A. However, the foundation drawings do not call for waterproofing, except at the elevator pit on Drawing S050. The Architectural Drawings only call out for vapor barrier as shown on Detail 9/A501. Please confirm if the foundation requires just vapor barrier, or waterproofing per section 071300.	Wherever "vapor barrier" is shown on the drawings, it shall be Preprufe 300R (or approved equal as listed in 071300, Article 2.1) below-grade waterproofing. Refer to updated Drawings A500 and A501, included with this Addendum.
27	Drawing C102 identifies a prop. 6" perforated HDPE in front of and behind building #8 storage. What is the top arrow pointing to? There is a trench drain nearby, but no line that matches the other dashed line that the lower one points to. Also, what are the inverts at the ends of the 2 sections that tie in the middle to the MH? And are the ends capped?	The top arrow (pointing to the east side of Building 8) has been revised. There is only a perforated HDPE pipe on the west side of Building 8. Pipes are not capped. Refer to updated Drawing C102, included with this Addendum.
28	Specification section 071300, Article 2.1 calls for Preprufe 300R from GCP or equal to be used below the slab on grade. However, Specification section 072616 calls for a 15 mil vapor barrier to be used below the slab on grade. Please advise which product is to be used.	The building is to receive Foundation Waterproofing, not Below-Grade Vapor Retarders. Specification section 072616 is not applicable to this project and deemed deleted from the Contract Documents. Refer to updated Volume 3, included with this Addendum, for clarification.
29	Details showing the below grade condition (per Drawing A500) show the below slab waterproofing or vapor barrier extending below the pile caps/ grade beams, and extending vertically up the outside face of pile cap/grade beam. If two different products are to be used, please clarify where one terminates and one begins.	See response to Question #28 above. The building is to received Foundation Waterproofing (per section 071300), not Below-Grade Vapor Retarders. Specification section 072616 is not applicable to this project and deemed deleted from the Contract Documents. Refer to updated Volume 3, included with this Addendum, for clarification.

30	Re: Addendum 2 Phase I Site Logistics Plan: please indicate if the building demolition and grading is in this contract's scope of work Site logistics and Drawing DM100 are contradicting.	Yes, Building Demolition and Grading is under this Contract. Refer to updated DM100, included with this Addendum.
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DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revisions to Volume 3:

Table of Contents: Section 072616 is removed.
07 26 16 Below-Grade Vapor Retarder is removed.
08 11 13 Hollow Metal Doors and Frames is revised.
23 35 16 Engine Exhaust Systems is revised.
26 32 14 Generator Tap Box is revised.

Revisions to the Drawings:

<u>Drawing No.</u>	<u>Description of Change</u>
C102	Removed arrow pointing to east side of Building 8.
L101	Changed the direction of the hatch for trench drain protection on the Legend
DM100	Removed notes near “Rodman’s Neck Training Facility Entry”.
A500	Changed callout from “Vapor Barrier” to “Foundation Waterproofing”.
A501	Changed callout from “Vapor Barrier” to “Foundation Waterproofing”.
A711	Changed Floor Type to F9.0. Changed Ceiling Type to C9.0
E010	Added power outlets at Generator docking station
E102	Added disconnect switch for EWH-1
E103	Added disconnect switches for ACC-1 DP-5 and ACC-1 DP-10
E201	Added (2) fixtures Type J1. Note: contractor to provide circuit for this fixture. Switching shall be as per exterior lighting.
E203	Added (2) fixture types N1
E301	Showed additional power outlets at generator docking station on power diagram
E401	Updated DP schedule

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 4 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Changes:

The Bid Opening scheduled for March 16, 2023 at 2:30pm is rescheduled for March 28, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

March 20, 2023

ADDENDUM No. # 6

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for March 16, 2023, at 2:30 pm is rescheduled to March 28, 2023 at 2:30 pm.**
Contract #1 – General Construction Work
2. **Bidders Questions and Responses to Questions:**
See Attachment A
3. **Revisions to Documents:**
See Attachment B
4. **Revisions to PASSPort forms:**
See Attachment C

Transferring Data Between Rounds of an RFX: A new document titled “Transferring Data Between Rounds of an RFX” has been added to the Documents section of the View RFX tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Drawing ES002, Detail #1 shows feed to the Bomb Squad Building property line box as 4 sets (4#600, 4" conduit) and (2) 4" spare conduits. Detail #2 refers to ES200 detail #7. Detail #7 on ES200 shows (4) 5" and (2) 4" spares. Can you please clarify which conduit sizes are needed?	Detail 7/ES-200 shows the typical concrete encasement for a duct bank, with required reinforcing, concrete coverage, etc. Detail 1/ES002 shows (6) 4" conduits and (2) 4" conduit spares. Number of conduits on Detail 1/ES002 is correct. The duct bank shall be sized for the number of conduits shown on detail 1/ES002.
2	Are two layers of impact board/ abuse-resistant GWB required for partition type 3? Typically, it is one layer of impact board/ abuse-resistant GWB, followed by standard GWB. Please advise.	Yes, 2 layers of impact board are required, as per partition type.
3	Re: Phase 1 Site Logistics Plan DM100 Addendum # 2: Notes were added for temporary fencing on Jersey barriers in Northeast Parking lot. Is this to be installed & maintained under this contract, or by the contractor that will be building the two new buildings?	Yes fence to be provided and maintained under this contract, as per Addendum #2.
4	Re: Phase 1 Site Logistics Plan DM100 Addendum # 2: The two new buildings by others is shown in the temporary fenced in area. What is the schedule for this work in relation to the Bomb Squad contract work? Will both sites be in construction at the same time?	The buildings in the fenced-in area will be relocated before work begins on this contract.
5	Re: Phase 1 Site Logistics Plan DM100 Addendum # 2: The existing Bomb Squad Building #1 has been hatched and noted as 'Building to be Demoeed by others.' Please clarify who are 'by others?' Is the intent that Building #1 is demoeed under this contract after phase 1 work is completed?	All work associated with the Demo of "BSC Building #1 Bomb Squad Building" is under this Contract. Refer to updated Phase 1 Site Logistics Plan, included with this Addendum.
6	There is a note for the existing building to be demoeed at the Frank Range. This is outside of the contract area of work on the Site Logistics Plan DM100. Please clarify if this work will be completed under another contract?	Building F (Frank) to be demoeed as shown on drawing DM101. Demolition of Frank is part of this contract.
7	Please confirm that the permanent electrical generator is provided by others (not the GC). No specification is given.	Correct. No permanent generator is to be provided under this contract.
8	Re: Drawing ES001: The P1 (pole light "fixture") specification is invalid and / or missing information. Please provide specifications, including mounting options, features, lumens, etc.	Lighting pole detail is provided on drawing ES-200. Pole footing is shown on drawing ES201.

9	Drawing A101 identifies floor finish F 1.0 in the elevator pit. Are we to install the epoxy on the floor and walls inside of the elevator pit?	Yes.
10	Drawing DM100 identifies BSC BLDG #6 to be removed, but at the walk thru it was identified to be relocated. Please clarify.	Building 6 is to be demolished as per note on the Drawing DM100.
11	Re: Drawing DM100: Could you provide the weights for the (12) MTL containers to be relocated?	No, this information is not available at this time.
12	Drawing DM101 identifies the BSB building #7 relocated by others (NIC)? Is that correct? Is this not the existing trailer next to the BSC Bldg #8?	Building 7 is to be relocated before the start of construction by others. The relocation of this building is N.I.C.
13	Re: Addendum 1, Question #10: Please confirm that the roof of the new structure is a metal deck with insulation and finish roofing materials, and there is no exposed concrete to apply this clear sealer.	Yes, response to this question per Addendum 1 is correct.
14	Re: Drawings A301, A302 and A981: A recessed graphic with the NYPD Bomb Squad is identified. The text is identified, but is there more info on the "graphic" to be used (such as material)?	The sign is to be cast, recessed 2" into the cast-in-place concrete as shown on 2/A981. The only material is concrete.
15	Please confirm the roof top PV panels are by others (NIC).	No, they are provided by the contractor under this contract. PVs are described in Drawing E103 and in Specification section 263100 Photovoltaic Collectors.
16	Decorative metal specification section 057000 identifies "metal clad stair sidewalls," but this is not identified on the drawings. The interior stair calls for 8GA. steel plates painted. Please clarify.	"Metal clad stair sidewalls" as described in Section 057000 is a general description of the stair walls. The detail on the drawing governs the actual design and materials.
17	Specification section 142400 -19 identifies that the elevator cab is to receive 1/8" thick aluminum diamond plate flooring. Is there a basis of design or manufacturer?	No, there is no basis-of-design. 1/8" thick diamond-plate aluminum is a generic product.
18	Drawing A741 identifies painted steel corner guards at CMU walls. Are we to assume 16GA steel?	Detail 4/A741 calls out SS (stainless steel), not painted, for the corner guards.
19	On Drawing A840, there is a wall type W11.0 but we cannot find the location on the drawings. Please advise.	Wall finish type W.11 is shown on Elevation 1 and 3/A600 on metal panels.
20	In an effort to streamline the Bid Submission, we have been uploading the necessary documents and answering the necessary questions in the PASSPort portal in advance of the February 16 deadline. Twice today, however, we have been prompted via email to reaffirm that we will be bidding on this project and after both times we reaffirmed, all of the progress we had previously made was lost, and we had to reupload and re-answer everything we had already done. Is there a way for us to prevent this from happening again?	Please contact MOCS for assistance: https://mocssupport.atlassian.net/servicedesk/customer/portal/8

21	Drawing C100 shows curbs on both sides of the 3' gravel walkway from the concrete apron at the main building up to the storage shed area. However, Drawing A002 only shows it on the outside edge along the asphalt (not the grasses side) Which is correct?	Drawing A002 is correct. There is no curb on the lawn side of the walkway.
22	Drawing A002 shows 2 notes that refer to Civil Drawings, but nothing about either of these notes are on the Civil Drawings. The Site Utilities do not show this either (nor end of electrical). Please advise.	Notes on A002 are general, not specific.
23	Are there any sidewalk bridge or shed requirements?	Sidewalk Bridges and sheds are only required if needed to comply with NYC Building Code.
24	Per Addendum #1, the roof slab is to receive the clear, non-yellowing sealer. Please provide extents of slab on metal deck for the roof level. None are shown on drawings.	See response to Question #13 above. Yes, the roof slab is to receive the clear, non-yellowing sealer. Extent of slab is shown of roof plan.
25	Re: Addendum 2 Phase I Site Logistics Plan: is temporary fencing part of this contract, or by others?	Yes, temporary fencing is under this Contract.
26	On Drawing ES101, pull box at LP-3 indicates to refer to Detail #7 on ES200 for ductbank details. Can you clarify if all conduit runs from pull box to pull-box to be in a concrete ductbank? This is not indicated on the one-line or any other pull-box.	Detail 7/ES200 shows a typical detail for concrete encasement of buried conduits. The number of conduits in each location is shown on the plan and 1-line diagrams. There may be 3, 4, 6 or other numbers of conduits in a given location. The detail shows the required concrete coverage of conduits, reinforcing, etc. The contractor must adapt the detail to each location and size the overall concrete encasement for the required number of conduits.
27	Drawing ES002, Detail 1 shows a new 500KVA 4160V/120/208V step down transformer. Please advise if Con Edison is providing both the enclosure and the transformer.	The Contractor provides and installs the enclosure and the transformer.
28	Please provide a detailed specification for K-Link Medium Voltage Fusible Disconnect for 100A at 4160V, shown on Drawing ES002.	Specification not available. This is a generic item.
29	On Drawing ES-101, pull box at LP-3 indicates to refer to detail #7 on ES200 for ductbank details. Can you clarify if all conduit runs from pull box to pull-box to be in a concrete ductbank? This is not indicated on the one-line or any other pull-box.	All conduit runs from pull box to pull box shall be encased in concrete as per detail 7 on ES200. The size of the encasement is based on the number of feeds in the bank.
30	Detail 4/A510 needs to be modified. The sill base needs to be built up level or above the exterior sloped concrete.	The detail shown is correct. The manufacturer is creating a custom window frame/sill with the extended sill as shown on the detail.
31	Doors 2.00 & 2.10 are listed as door Type "E". This looks to be a HM door type, not an Aluminum door type. Please confirm this is the correct door type.	Doors 2.00 and 2.10 are aluminum, as shown on the door schedule.
32	In Addendum #2, the light court glass was changed to be laminated glass. In the revised specification section, "08 81 00 Glass Glazing", Article 2.2.E.2.a, it does not indicate this change. Please clarify the type(s) of glass to be used in the windows (W10 - W15).	Specification Section 088100 describes several different glass types. The drawings indicate which window, or storefront or other glazed opening gets which type of glass. The glass assembly and glass type are shown on the window schedule in the column "Glazing."

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revisions to Appendix:

Bomb Squad Phase 1 Site Logistics Plan: Building 1 to be demolished under this Contract.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 5 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Changes:

None

Questionnaire Changes:

None

Item Grid Changes:

None

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

March 28, 2023

ADDENDUM No. # 7

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85023B0022 – SANDBOMB

NYPD Bomb Squad Building

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

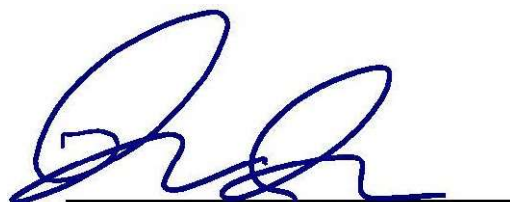
The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for March 28, 2023, at 2:30 pm is rescheduled to March 30, 2023 at 2:30 pm.**
Contract #1 – General Construction Work
2. **Bidders Questions and Responses to Questions:**
See Attachment A
3. **Revisions to Documents:**
See Attachment B
4. **Revisions to PASSPort forms:**
See Attachment C

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If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.



Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	An Allowance for Expanded Work is shown in the allowance forms in the PASSPort Item Grid as \$884,299.19. However, Addendum 5 says this item does not apply. Should we be including this cost in our bid?	Yes, Expanded Work Allowance applies as noted in the PASSPort Item Grid. See updated Addendum to General Conditions, included with this Addendum.

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revisions to Volume 3:

Addendum to the General Conditions, p.3: 012200 Expanded Work Allowance is marked as 'Applies.'

DDC PROJECT #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 6 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Changes:

The Bid Opening scheduled for March 28, 2023 at 2:30pm is rescheduled for March 30, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None



THE CITY OF NEW YORK DEPARTMENT OF DESIGN AND CONSTRUCTION DIVISION OF PUBLIC BUILDINGS

ADDENDUM TO THE GENERAL CONDITIONS FOR SINGLE CONTRACT PROJECTS

The General Conditions are hereby amended in accordance with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #: SANDBOMB

PROJECT NAME: NYPD Bomb Squad Building

PROJECT DESCRIPTION: This Project consists of the development of a new building for the NYPD Bomb Squad within the Rodman’s Neck complex in the Bronx, NY.

PROJECT LOCATION: 100A Rodman’s Neck Path
BOROUGH: Bronx
CITY OF NEW YORK
ZIP CODE: 10464
COMMUNITY BOARD #: 10

LANDMARK STATUS:

DESIGNATED LANDMARK STRUCTURE OR SITE: NO
If this is a Designated Landmark Structure or Site, Section 01 3591, Historic Treatment Procedures applies to this project.
LANDMARK QUALITY STRUCTURE: NO
If this is a Landmark Quality Structure, Section 01 3591, Historic Treatment Procedures applies to this project.

II. LEED GREEN BUILDING REQUIREMENTS

NOT USED

III. COMMISSIONING REQUIREMENTS

This project includes MEP and Building Enclosure Commissioning Requirements.

The General Commissioning Requirements for MEP Systems are found in Section 01 9113 of the DDC Standard General Conditions.

The General Commissioning Requirements for Building Enclosure are found in Section 01 9115 of the DDC Standard General Conditions.

Other specific Commissioning Requirements can be found in the Project Specification Sections.

IV. PROJECT MANAGEMENT

DDC shall publicly bid and enter into all contracts for the Project. DDC shall manage the Project using its own personnel.

DDC shall publicly bid and enter into all contracts for the Project. A Construction Management firm (the "CM") hired by DDC shall manage the Project. The Contractor is advised that the CM shall serve as the representative of the Commissioner at the site and shall, subject to review by the Commissioner, be responsible for the inspection, management, coordination and administration of the required construction work, as delineated in the article of the Standard Construction Contract entitled "The Resident Engineer".

V. CONTRACTS FOR THE PROJECT

The Project consists of a single contract, the Contract for General Construction Work. The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents (General Conditions, Drawings and Specifications), including all responsibilities and obligations assigned to separate Contractors for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work. All responsibilities and obligations in the Contract Documents assigned to separate Contractors for such subdivisions of the work are the responsibility of the Contractor for General Construction Work.

VI. SCHEDULES

The Contractor is advised that Schedules A through E are attached to, and incorporated as part of, this Addendum to the General Conditions. These schedules contain important information that is specific to this Project. The Contractor is advised to carefully review these schedules.

VII. APPLICABILITY OF SECTIONS/SUB-SECTIONS AND AMENDED SUB-SECTIONS

The Contractor is advised that various Sections/Sub-Sections in the General Conditions may not apply to this Project or may apply as amended. Such Sections/Sub-Sections advise the Contractor to "Refer to the Addendum for the applicability of this Section/Sub-Section." Such Sections/Sub-Sections are set forth below. A check mark indicates whether the Section/Sub-Section (1) applies to the Project, (2) does not apply to the Project, or (3) applies to the Project as amended. If no box is checked, the Section/Sub-Section, as set forth in the General Conditions, applies to the Project. Amended Sections/Sub-Sections, if any, are set forth following this list of Sections.

<u>Section</u>	<u>Sub-Section</u>	<u>Sub-Section</u>	<u>Applies</u>	<u>Does not Apply</u>	<u>Applies as Amended</u>
01 1000	1.4 (B)	Scope and Intent / LEED		X	
	1.4(C)	Scope and Intent / Commissioning	X		
01 22 00		Expanded Work Allowance	X		
01 3216.10		Project Schedules (Method A)		X	
01 3216.20		Project Schedules (Method B)		X	
01 3216.30		Project Schedules (Method C)	X		
	1.7 Q	Cost Loaded Schedule	X		
01 3233		Photographic Documentation	X		
01 3300	1.7 (A-D)	LEED Submittals		X	
01 3503		General Mechanical Requirements	X		
01 3506	3.2 (A-B)	Electrical Conduit System Including Boxes (Pull, Junction and Outlet)	X		
	3.3 (A-E)	Electrical Wiring Devices	X		
	3.4 (A-I)	Electrical Conductors and Terminations	X		
	3.5 (A-B)	Circuit Protective Devices	X		
	3.6 (A-J)	Distribution Centers	X		
	3.7 (A-I)	Motors	X		
	3.8 (A-I)	Motor Control Equipment	X		
01 3591		Historic Treatment Procedures		X	
01 5000	3.2 (A)	Temporary Water Facilities / Temporary Water	X		
	3.2 (B)	Temporary Water Facilities / Temporary Water – Work in Existing Facilities		X	
	3.3 (B)	Temporary Sanitary Facilities / Self-Contained Toilet Units	X		
	3.3 (C)	Temporary Sanitary Facilities / Existing Toilets		X	
	3.4 (B) 1	Temporary Power, Lighting, and Site Lighting / Connection to Utility Lines	X		
	3.4 (B) 2	Temporary Power, Lighting, and Site Lighting / Connection to Existing Electrical Power Service	X		
	3.4 (B) 3	Temporary Power, Lighting, and Site Lighting / Electrical Generator Power Service	X		
	3.4 (D)	Temporary Power, Lighting, and Site Lighting / Temporary Lighting	X		
	3.4 (E)	Temporary Power, Lighting, and Site Lighting / Site Security Lighting (for New Construction Only)	X		
	3.5 (A-J)	Temporary Heat	X		
	3.8 (A)	DDC Field Office / Office Space in Existing Building		X	

<u>Section</u>	<u>Sub-Section</u>	<u>Sub-Section</u>	<u>Applies</u>	<u>Does not Apply</u>	<u>Applies as Amended</u>
01 5000	3.8 (B)	DDC Field Office / DDC Field Office Trailer		X	
	3.8 (B-3a)	DDC Field Office / DDC Managed Field Office Trailer		X	
	3.8 (B-3b)	DDC Field Office / CM Managed Field Office Trailer			X
	3.8 (D)	DDC Field Office / Additional Equipment for the DDC Field Office			X
	3.13(A-D)	Work Fence Enclosure	X		
	3.17(B)	Project Rendering	X		
	3.18 (A-C)	Security Guards / Fire Guards on Site	X		
01 5411	3.1 (A-J)	Temporary Use, Operation and Maintenance of Elevators During Construction for New Buildings Up To and Including 15 Stories		X	
	3.2 (A-M)	Temporary Use, Operation and Maintenance of Elevators During Construction for New Buildings Over 15 Stories		X	
	3.3 (A-E)	Temporary Use, Operation and Maintenance of Elevators During Construction for Existing Buildings		X	
01 7300	3.3 (A-I)	Surveys	X		
	3.4 (A-B)	Borings	X		
	3.12 (A-D)	Sleeves and Hangers	X		
	3.13 (A)	Sleeve and Penetration Drawings	X		
	3.15 (A)	Location of Partitions	X		
01 7419	1.5 (C)	Waste Management Performance Requirements / LEED Certification		X	
01 7900		Demonstration and Owner's Pre-Acceptance Orientation	X		
01 8113.03		Sustainable Design Requirements for LEED v3 Buildings		X	
01 8113.04		Sustainable Design Requirements for LEED v4 Buildings		X	
01 81 13.10		Environmentally Preferable Purchasing (EPP) Compliance		X	
01 8113.13		VOC Limits for Adhesives, Sealants, Paints and Coatings for LEED v3 Buildings		X	
01 8119		Indoor Air Quality Requirements for LEED Buildings		X	
01 9113		General Commissioning Requirements for MEP Systems	X		
01 9115		General Commissioning Requirements for Building Enclosure	X		

AMENDED SECTIONS/SUB-SECTIONS

The Contractor is advised that the amended Sub-Sections set forth below are included in the General Conditions and apply to the Project.

Section 01 50 00 Sub-section 3.8(B-3b) is amended as follows:

- 1) Overall Length: 60 feet
Overall Width: 10 feet
- 3) Provide four (4) complete computer workstations and two (2) tablets as specified in sub-section 3.8.D herein. Provide one (1) each complete computer workstation in each private office and one (1) complete computer workstation at the secretarial position as directed by the Resident Engineer.

Section 01 50 00 Sub-section 3.8(B-12) is amended as follows:

- a. Six (6) single pedestal desks, 42" x 32"; six (6) swivel chairs with arms and three (3) side chairs without arms to match desk. Six (6) full ball bearing two (2) drawer vertical legal filing cabinets with locks.
- c. Six (6) metal wastebaskets.

Section 01 50 00 Sub-section 3.8(B-13d) is deleted.

Section 01 50 00 Sub-section 3.8(D2) is deleted.

Section 01 50 00 Sub-section 3.8(D3a) is amended as follows:

Add the following:

10) Laptop Workstation:

Provide four (4) Personal Computers NYPD – Each Laptop Configuration.

- | | |
|------------------------|--|
| a) Make and Model: | Dell Inspiron 15 7000 2-in-1(Black Edition), or an approved equal. (Note: an approved equal requires written approval of the DDC Assistant Commissioner of ITS.) |
| b) Processor: | 11th Generation Intel Core i7-1165G7U Processor (12MB Cache, up to 4.7 GHz) |
| c) Graphics Card | Intel Iris Xe MAX graphics 4GB |
| d) System RAM: | 16GB, 16GBx1, DDR4 2666MHz |
| e) Memory | 16GB, 2x8GB, DDR4, 3200MHz |
| f) Hard Disk Drive(s): | 1TB M.2 PCIe NVMe Solid State Drive |
| g) I/O Ports: | 1x Combo Jack (Headphone / Microphone), 1x HDMI 2.0 Port, 2x USB 3.2 Gen 1 Type A, 1 Thunderbolt 4 (type C port with PowerShare and DisplayPort) |
| h) Video Display Card: | Intel UHD Graphics 620 with shared graphics memory |
| i) LCD Panel: | 15.6-inch UHD (3840 x 2160) Truelife Touch Narrow Border WVA Display with Active Pen support |
| j) WI-FI | 802.11ac 2x2 WiFi and Bluetooth |

- k) Carrying Case Nylon Carrying Case specifically designed for model being provided.
- l) Accidental Damage 3 Year Complete Care Accidental Damage Protection
- m) Other Peripherals: Dell Wireless Mouse – WM326, Dell USB Slim DVD+RW Drive, Dell Portable SSD, USB-C 250GB
- n) Operating System Windows 10 Professional
- o) Software Requirement Microsoft Office 2019 Professional; Microsoft Project 2016 Professional, Adobe Acrobat Professional DC, Anti-Virus software package w/ 3 year updates subscription, AutoCAD 2019
- p) Warranty 3 Year Basic Limited Warranty and 3 Year NBD On-Site Service

VIII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

Refer to the PASSPort Questionnaire for Special Experience Requirements.

IX. REVISIONS: SPECIFICATIONS AND CONTRACT DRAWINGS

The Specifications and the Contract Drawings for the Project are revised in accordance with the provisions set forth below.

- (1) Owner: Wherever the term "Owner" is used in the Specifications and/or the Contract Drawings, such term shall mean the City of New York.
- (2) Other Entities: In the event any entity other than the City of New York is referred to or named as the "Owner" in the Specifications and/or the Contract Drawings, the name of such other entity is deemed deleted and replaced with the "City of New York".
- (3) Architect / Engineer: Wherever the words "Architect", "Engineer", "Architect / Engineer" or "Architect and/or Engineer" are used in the Specifications and/or the Contract Drawings, such words are deemed deleted and replaced with the word "Commissioner".
- (4) Products / Manufacturers: Wherever the Specifications and/or the Contract Drawings require the Contractor to provide a particular product (i.e., material and/or equipment) from a designated manufacturer and/or vendor, the term "or approved equal" is deemed inserted, even if only one product and/or manufacturer is specified, except as otherwise provided below.
 - (a) Proprietary Items: If the Documents section in PASSPort contains a Notice which identifies a particular product from a designated manufacturer as a "Sole Source Product, the Contractor shall be required to provide such specified product. In such case, no substitution or "approved equal" will be permitted.
- (5) Special Experience Requirements: Special Experience Requirements for the Project, if any, are set forth in the PASSPort Questionnaire. Special Experience Requirements may apply to Contractors, subcontractors, installers, fabricators, applicators, erectors, specialists, manufacturers and/or suppliers. Refer to DDC General Conditions Section 014000 Article 1.7.C for applicable Special Experience qualification levels. If the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth in the PASSPort Questionnaire, such Special Experience Requirement is deemed deleted, except as otherwise provided below.
 - (a) Any Special Experience Requirement that provides that the entity performing the work or supplying the material must have more than three (3) years of experience, is revised to provide that the entity performing the work or supplying the material must have three (3) years of experience as noted in DDC General Conditions Section 014000 Quality Requirements, Article 1.7.B, except as described in paragraph (b) below.
 - (b) Any Special Experience Requirement that pertains to the abatement of hazardous materials must not be subject to the deletion and/or revision set forth above. Such Special Experience Requirement will remain in full force and effect.
 - (c) Any Special Experience Requirement that provides that the individual workers performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such individual workers must be properly trained for the specified work.
- (6) Alternate Bids: If the agency is requesting the submission of Alternate Bids, a Notice regarding such Alternate Bids is set forth in the Documents section in PASSPort. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Documents section in PASSPort and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Documents section in shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Documents section in PASSPort, and the Specifications and/or the Contract Drawings contain any provision regarding Alternate Bids, such provision is deemed deleted.
- (7) Contractor Retained Engineer: If the Specifications and/or the Contract Drawings require the Contractor to retain an Engineer to provide engineering services for the Project, the following sentence is deemed inserted: "Such Engineer must be a Professional Engineer, licensed in the State of New York."
- (8) LEED Related Provisions: If the Specifications and/or the Contract Drawings require the Contractor to purchase FSC certified wood, rapidly renewable materials, or materials within 500 miles (LEED v3) or 100 miles (LEED v4), such provisions are deemed deleted and replaced with the requirement that if the Contractor has purchased

FSC certified wood, rapidly renewable materials, or materials within 500 miles (LEED v3) or 100 miles (LEED v4), the Contractor shall submit such forms or documentation as may be required by the City in order for the USGBC to certify that the Project qualifies for the related LEED credit(s).

- (9) Guarantees: Requirements for Guarantees and Maintenance are set forth in Schedule B, which is included in the Addendum to the General Conditions. In the event of any conflict or inconsistency between (1) a guarantee and/or maintenance requirement set forth in the Specifications and/or the Contract Drawings and (2) a guarantee and/or maintenance requirement set forth in Schedule B, the guarantee and/or maintenance requirement set forth in Schedule B shall prevail.
- (10) Warranties: Requirements for Warranties are set forth in Schedule B, which is included in the Addendum to the General Conditions.
- (a) The term “manufacturer’s warranty” as described in this article encompasses the following terms as indicated in the Specifications: “Manufacturer’s Warranty”, “Manufacturer’s Special Warranty”, “Special Warranty”, “Special Finish Warranty”, “Manufacturer’s Special Warranty for a (product, assembly).”
 - (b) In the event of any conflict or inconsistency between (1) a warranty requirement set forth in the Specifications and/or the Contract Drawings and (2) a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall prevail.
 - (c) In the event a warranty requirement set forth in the Specifications and/or the Contract Drawings is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor’s obligation to provide the manufacturer’s warranty, as set forth in the Specifications and/or the Contract Drawings, shall remain in full force and effect.
 - (d) In the event a warranty requirement for a particular item of material or equipment is omitted from Schedule B, as well as from the Specifications or the Contract Drawings, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.
- (11) Exculpatory Provisions: In the event the Specifications and/or the Contract Drawings contain any provision whereby the consultant and/or any of its officers, employees or agents, including subconsultants, is absolved of responsibility for any act or omission, such provision is deemed deleted.
- (12) Insurance: Provisions regarding insurance coverage the Contractor is required to provide are set forth in Article 22 of the City of New York Standard Construction Contract and Schedule A, which is included in the Addendum to the General Conditions. In the event the Specifications and/or the Contract Drawings contain any provision regarding insurance requirements, such provision is deemed deleted.
- (13) Indemnification: Provisions regarding indemnification are set forth in Articles 7, 12, 22 and 57 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding indemnification, such provision is deemed deleted.
- (14) Dispute Resolution: Provisions regarding dispute resolution are set forth in Article 27 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding dispute resolution, such provision is deemed deleted.
- (15) Payment to Other Entities: In the event the Specifications and/or the Contract Drawings contain any provision which requires the Contractor to make payments to an entity other than a subcontractor and/or supplier providing services and/or material for the project, such provision is deemed deleted.
- (16) General Conditions: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the General Conditions, the General Conditions shall prevail.
- (17) Standard Construction Contract: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the City of New York Standard Construction Contract, the City of New York Standard Construction Contract shall prevail.
- (18) Shall: Wherever the word “shall” is used in the Specifications and/or the Contract Drawings with respect to the Contractor’s or Subcontractor’s responsibilities or Project Requirements, the term is intended to convey a contractual mandate, such as the terms “must,” “will,” or “be obliged to” (and not “may”).

SCHEDULE A (FOR PUBLICLY BID PROJECTS)
PART I - Contract Requirements

Various Articles of the Contract refer to requirements which are set forth in Schedule A of the General Conditions. The Schedule set forth below specifies the following: (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the contract.

REFERENCE	ITEM	REQUIREMENTS	CONTRACT #1
Information For Bidders	Bid Security	The Contractor must obtain a bid security in the amount indicated to the right.	Required provided the TOTAL BID PRICE set forth on the Bid Form is \$1,000,000. or more. Certified Check: 2% of Bid Amount or Bond: 10% of Bid Amount
Information For Bidders	Performance and Payment Bonds		For Contracts in the amount of \$1,000,000.00 or more, Performance and Payment Bonds must each be in amount equal to 100% of the Contract Price.
Information For Bidders	Department of Design and Construction Safety Requirements	The Contractor must provide the safety personnel as indicated to the right	<input checked="" type="checkbox"/> Project Safety Representative <input type="checkbox"/> Dedicated, full-time Project Safety Representative
Article 14 Contract	Time of Substantial Completion	Consecutive Calendar Days	720
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	\$600
Article 17 Contract	Sub-Contracts	Not to exceed Percent of Contract Price	60%
Article 21 Contract	Retainage	Percent of Voucher	If 100% bonds are required 5% If 100% bonds are not required, and Contract Price is \$1,000,000 or less 5% If 100% bonds are not required, and Contract Price is more than \$1,000,000 10%
Article 24 Contract	Deposit Guarantee	Percent of Contract Price	1%
Article 24 Contract	Period of Guarantee		See Schedule B of the Addendum to the General Conditions
Article 75 Contract	Compensation to be Paid to Contractor		Amount for which the Contract was Awarded: _____ Dollars (\$ _____)
Article 79 Contract	MWBE Program		See M/WBE Utilization Plan in the PASSPort Procurement M/WBE Considerations Section.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Note: All certificate(s) of insurance submitted pursuant to Contract Article 22.3. 3 must be accompanied by a Certification by Broker consistent with Part III below and include the following information:

- For each insurance policy, the name and NAIC number of issuing company, number of policy, and effective dates;
- Policy limits consistent with the requirements listed below;
- Additional insureds or loss payees consistent with the requirements listed below; and
- The number assigned to the Contract by the City (in the “Description of Operations” field).

Insurance indicated by a blackened box (■) or by (X) in the to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<p>■ Commercial General Liability Art. 22.1.1</p>	<p>This Contract requires Commercial General Liability Insurance (CGL) that is at least as broad as ISO Form CG 00 01 (see Section 22.1.1 of the New York City Standard Construction Contract).</p> <p>The minimum limits shall be <u>\$1,000,000.00</u> per occurrence and <u>\$2,000,000.00</u> per project aggregate applicable to this Contract unless the Work requires a permit from the Department of Buildings and greater limits of Commercial General Liability Insurances are required pursuant to 1 RCNY section 101-08.</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, with coverage at least as broad as ISO Forms CG 20 10 and CG 20 37, and</p> <p>2. All person(s) or organization(s), if any, that Article 22.1.1(b) of the Contract requires to be named as Additional Insured(s), with coverage at least as broad as ISO Form CG 20 26. The Additional Insured endorsement shall either specify the entity's name, if known, or the entity's title (e.g., Project Manager).</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (■) or by (X) in the to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<ul style="list-style-type: none"> ■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2 ■ Employers' Liability Art. 22.1.2 <input type="checkbox"/> Jones Act Art. 22.1.3 <input type="checkbox"/> U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.3 	<p>Workers' Compensation, Employers' Liability, and Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction.</p> <p>Note: The following forms are acceptable: (1) New York State Workers' Compensation Board Form No. C-105.2, (2) State Insurance Fund Form No. U-26.3, (3) New York State Workers' Compensation Board Form No. DB-120.1 and (3) Request for WC/DB Exemption Form No. CE-200. The City will not accept an ACORD form as proof of Workers' Compensation or Disability Insurance.</p> <p>Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.</p>
<ul style="list-style-type: none"> ■ Builders' Risk Art. 22.1.4 	<p>100 % of total value of Work</p> <p>Contractor the Named Insured; the City both an Additional Insured and one of the loss payees as its interests may appear.</p> <p>If the Work does not involve construction of a new building or gut renovation work, the Contractor may provide an installation floater in lieu of Builders Risk insurance.</p> <p>Note: Builders Risk Insurance may terminate upon Substantial Completion of the Work in its entirety.</p>
<ul style="list-style-type: none"> ■ Commercial Auto Liability Art. 22.1.5 	<p>\$1,000,000.00 per accident combined single limit</p> <p>If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (■) or by (X) in the to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<input type="checkbox"/> Contractor's Pollution Liability Art. 22.1.6	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Protection and Indemnity Art. 22.1.7(a)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Hull and Machinery Insurance Art. 22.1.7(b)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Pollution Liability Art. 22.1.7(c)	\$ _____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 <input type="checkbox"/> Ship Repairers Legal Liability	\$ _____ each occurrence

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> Collision Liability/Towers Liability</p>	<p>\$ _____ per occurrence</p> <p>\$ _____ aggregate</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____</p>
<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> Railroad Protective Liability _____</p>	<p>\$ _____ per occurrence</p> <p>\$ _____ aggregate</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____</p>
<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> Asbestos Liability _____</p>	<p>Only required of the Contractor or Subcontractor performing any required asbestos removal.</p> <p>\$1,000,000 each occurrence, \$2,000,000 aggregate (Combined Single Limit); only required of the Contractor or Subcontractor performing any required asbestos removal.</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the to left will be required under this contract.

<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> Boiler Insurance _____</p>	<p>\$200,000</p>
<p>[OTHER] Art. 22.1.8</p> <p>■ Professional Liability</p> <p>In the event any section of the Specifications requires the Contractor to engage a Professional Engineer to provide design and/or engineering services, the Engineer engaged by the Contractor, as well as any sub consultant(s) performing professional services, shall provide Professional Liability Insurance.</p>	<p>\$1,000,000 per occurrence</p> <p>The Contractor's Professional Engineer shall maintain and submit evidence of Professional Liability Insurance in the minimum amount of \$1,000,000 per claim. The policy or policies shall include an endorsement to cover the liability assumed by the Contractor under this Agreement arising out of the negligent performance of professional services or caused by an error, omission or negligent act of the Contractor's Professional Engineer or anyone employed by the Contractor's Professional Engineer.</p> <p>Claims-made policies will be accepted for Professional Liability Insurance. All such policies shall have an extended reporting period option or automatic coverage of not less than two (2) years. If available as an option, the Contractor's Professional Engineer shall purchase extended reporting period coverage effective on cancellation or termination of such insurance unless a new policy is secured with a retroactive date, including at least the last policy year.</p>
<p>OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> Umbrella/Excess Liability Insurance</p> <p>The Contractor shall provide Umbrella/Excess Liability Insurance in the minimum amounts shown to the right. The policy terms and condition should be at least as broad as the underlying policies. The underlying policies should comply with the insurance provision as outlined by the contract. Defense cost should be in addition to the limit of liability. The City of New York, including its officials and employees, should be included as additional insured as respects to the noted project.</p>	<p>\$10,000,000 per Occurrence and \$10,000,000 in Aggregate</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certificates of Insurance

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

- (1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

- (2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

[Name of broker or agent (typewritten)]

[Address of broker or agent (typewritten)]

[Email address of broker or agent (typewritten)]

[Phone number/Fax number of broker or agent (typewritten)]

[Signature of authorized official or broker or agent]

[Name and title of authorized official, broker or agent (typewritten)]

State of)
) ss:
County of)

Sworn to before me this
____ day of _____, 20__

NOTARY PUBLIC FOR THE STATE OF _____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART IV. Address of Commissioner

Wherever reference is made in Article 7 or Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents must be sent via email to insurance@ddc.nyc.gov. Hard copies of such documents will no longer be required or accepted.

SCHEDULE B

Guarantees and Warranties

(Reference: Section 01 7839, Article 2.7 of the DDC Standard General Conditions)

GUARANTY FROM CONTRACTOR

(1) Contractor’s Guaranty Obligation: The Contractor shall promptly repair, replace, restore or rebuild, as the Commissioner may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of Substantial Completion (or use and occupancy in accordance with the Contract), except for the areas of Work set forth below:

- Roofing, Waterproofing, and Joint Sealant Work. For these types of work, the guarantee period shall be (2) two years.
- Trees and/or Plant Material. For trees and/or plant material furnished and installed, the guarantee period shall be (2) two years. During the guarantee period, the Contractor shall provide all maintenance services set forth in the Specifications.

(2) Guaranty Period: The obligation of the Contractor, and its Surety under the Performance Bond, is limited to the period(s) of time specified above.

(3) Other Provisions Deemed Deleted: In the event the Specifications and/or the Contract Drawings contain any provisions regarding guaranty requirements, such provisions are deemed deleted and replaced with the guaranty requirements set forth in this Schedule B.

WARRANTY FROM MANUFACTURER

(1) Contractor’s Obligation to Provide Warranties: The items of material and/or equipment for which manufacturer warranties are required are listed below. For each item of material and/or equipment listed below, the Contractor shall obtain a written warranty from the manufacturer. Such warranty shall provide that the material or equipment is free from defects for the period set forth below and will be replaced or repaired within such specified period. The Contractor shall deliver all required warranties to the Commissioner.

(2) Required Warranties:

Specification Number	Material or Equipment	Warranty Period (years)
06 61 16	Solid Surfacing Fabrications	10
07 13 00	Foundation Waterproofing	2
07 27 00	Air Barriers	3
07 42 13	Metal Wall Panels: Exterior Panel Finish	10
07 42 13	Metal Wall Panels: Wall System	5
07 52 00	Modified Bituminous Membrane Roofing	20
07 92 00	Joint Sealants	10
08 36 13	Sectional Doors	5
08 44 13	Glazed Aluminum Curtain Walls	10
08 44 13	Glazed Aluminum Curtain Walls: finish	20
08 51 13	Aluminum Windows	10
08 62 00	Unit Skylights	10
08 62 00	Unit Skylights: finish	10
08 71 00	Door Hardware: Closers	10
08 71 00	Door Hardware: Exit Devices	3

Specification Number	Material or Equipment	Warranty Period (years)
08 71 00	Door Hardware: Locksets and Cylinders	3
08 71 00	Door Hardware: All other Hardware	2
08 80 00	Glass and Glazing: Coated Glass	5
08 80 00	Glass and Glazing: Insulating Glass	10
08 80 00	Glass and Glazing: Laminated Glass	5
09 67 24	Resinous Flooring	3
10 21 13	Toilet Compartments	15
12 24 13	Roller Window Shades	25
13 31 13	Framed Fabric Structures: Fabric	10
22 05 33	Heat Tracing for Plumbing Piping	10
22 11 23.13	Domestic Packaged Water Booster Pumps	1
22 33 00	Electric Domestic Water Heaters	5
23 35 16	Engine Exhaust Systems	3
23 72 00	Air-to-Air Energy Recovery Equip.	1
23 72 00	Air-to-Air Energy Recovery Equip.: Heat Exchanger	6
23 72 00	Air-to-Air Energy Recovery Equip.: Compressor	2
23 72 00	Air-to-Air Energy Recovery Equip.: Energy Wheel	5
23 81 29	Variable Refrigerant Flow HVAC Systems	1.5
23 81 29	Variable Refrigerant Flow HVAC Systems: Compressor	6
23 82 39	Unit Heaters	1
23 82 39	Unit Heaters: Heating Element	5
26 05 13	Medium Voltage Cable	40
26 05 19	Low Voltage Electrical Power Conductors	10
26 09 23	Lighting Control Devices	1
26 31 00	Photovoltaic Collectors: Modules	20
26 31 00	Photovoltaic Systems: Inverter, Transformer	5
26 31 00	Photovoltaic Collectors: Support System	20
26 31 01	Data Acquisition for Photovoltaic System	5
26 32 14	Generator Tap Box	1
26 50 00	Lighting	2
26 50 00	Lighting: Ballasts	3
27 10 00	Structured Cabling	25
28 42 00	Gas Detection and Alarm	1
28 42 00	Gas Detection and Alarm: CO Sensor	3
28 42 00	Gas Detection and Alarm: NO2 Sensor	1
28 46 00	Fire Detection and Alarm	1

(3) Application: The obligations under the warranty for the periods specified above shall apply only to the manufacturer of the material or equipment, and not to the Contractor or its Surety; provided, however, the Contractor retains responsibility for obtaining all required warranties from the manufacturers and delivering the same to the Commissioner.

(4) Other Provisions: The warranty requirements set forth in this Schedule B are also included in the Specifications.

- (a) In the event of any conflict between a warranty requirement set forth in the Specifications and a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall take precedence.
- (b) In the event a warranty requirement set forth in the Specifications is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications, shall remain in full force and effect.

- (c) In the event a warranty requirement for a particular item of material or equipment is omitted from both Schedule B and the Specifications, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.
- (d) In the event a warranty requirement is provided for a particular item of material or equipment, and such requirement specifies a warranty period that is longer than that which is actually provided by any of the specified manufacturers, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by any of the specified manufacturers, unless otherwise directed in writing by the Commissioner.
- (e) Unless indicated otherwise Warranties are to take effect on the date of Substantial Completion.

SCHEDULE C

Contract Drawings

(Reference: Section 01 1000, Article 1.5 (A) of the DDC Standard General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.

<u>NUMBER</u>	<u>DRAWING TITLE</u>
1 . T000.00	TITLE, DWG SCHEDULE, KEY PLANS
2 . G001.00	GENERAL NOTES
3 . G002.00	SYMBOLS, ABBREVIATIONS & MOUNTING HEIGHTS
4 . G003.00	ACCESSIBILITY DIAGRAMS
5 . G004.00	CODE COMPLIANCE & LIFE SAFETY ANALYSIS
6 . G005.00	ZONING ANALYSIS, TIDAL WETLAND & FIRMS MAPS
7 . G006.00	SITE SURVEY
8 . G007.00	SITE SURVEY
9 . EN001.00	MECHANICAL ENERGY COMPLIANCE SHEET
10 . EN002.00	MECHANICAL ENERGY COMPLIANCE SHEET
11 . C100.00	SITE CIVIL PLAN
12 . C101.00	GRADING PLAN
13 . C102.00	SITE CONNECTION PROPOSAL
14 . C103.00	SITE UTILITY PLAN
15 . C104.00	CIVIL DETAILS
16 . DM100.00	SITE LOGISTICS PLAN
17 . DM101.00	DEMOLITION SITE PLAN
18 . DM102.00	EXISTING BOMB SQUAD BLDG DEMOLITION PLAN
19 . L101.00	SEDIMENTATION / EROSION CONTROL PLAN
20 . L102.00	SEDIMENTATION / EROSION DETAILS AND NOTES
21 . L103.00	SITE FENCE AND GATE LAYOUT PLAN
22 . L104.00	FENCE AND GATE DETAILS, NOTES
23 . L105.00	SITE PLANTING PLAN
24 . L106.00	PLANTING DETAILS, NOTES AND SCHEDULE
25 . A000.00	OVERALL SITE PLAN
26 . A001.00	BOMB SQUAD COMPOUND SITE PLAN
27 . A002.00	CONC APRON PLAN
28 . A101.00	1ST FLOOR PLAN
29 . A101M.00	1ST FLOOR MEZZANINE PLAN
30 . A102.00	2ND FLOOR PLAN
31 . A103.00	ROOF PLAN
32 . A104.00	STORAGE BLDG #8: 1ST FLOOR PLAN & REFLECTED CEILING PLAN
33 . A201.00	1ST FL REFLECTED CEILING PLAN
34 . A202.00	2ND FL REFLECTED CEILING PLAN
35 . A241.00	1ST FL CONDUIT ROUTING RCP
36 . A242.00	2ND FL CONDUIT ROUTING RCP

37	. A262.00	2ND FL ISOLATION & CONTROL JOINT PLAN
38	. A300.00	EXTERIOR ELEVATIONS: EAST AND NORTH
39	. A301.00	EXTERIOR ELEVATIONS: WEST AND SOUTH
40	. A302.00	EXTERIOR ELEVATIONS: WEST INSIDE FACES (BEHIND RAINSCREEN)
41	. A303.00	STORAGE BLDG #8: EAST & NORTH ELEVATIONS
42	. A304.00	STORAGE BLDG #8: WEST & SOUTH ELEVATIONS
43	. A400.00	N/S BUILDING SECTIONS
44	. A401.00	E/W BUILDING SECTIONS
45	. A402.00	STORAGE BLDG #8: SECTIONS
46	. A450.00	EXTERIOR WALL SECTIONS
47	. A451.00	EXTERIOR WALL SECTIONS
48	. A452.00	EXTERIOR WALL SECTIONS AT LIGHTWELL
49	. A500.00	EXTERIOR DETAILS: FOUNDATION
50	. A501.00	EXTERIOR DETAILS: CONC APRON & BOLLARDS
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68	. A556.00	EXTERIOR DETAILS: RAINSCREEN ASSEMBLY
69	. A557.00	EXTERIOR DETAILS: CANTILEVER ASSEMBLY
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76	. A700.00	STAIR DETAILS: STAIR 1
77	. A701.00	STAIR DETAILS: STAIR 1
78	. A702.00	STAIR DETAILS: STAIR 1
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80	. A706.00	STAIR DETAILS: STAIR 2

81	. A707.00	STAIR DETAILS: STAIR 2 & ALTERNATING TREAD STAIR
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89	. A750.00	FINISHES KEY & DETAILS
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103	. A984.00	FOUNDATION PLAN
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123	. M102.00	MECHANICAL ROOF PLAN
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125	.	M201.00	MECHANICAL FIRST FLOOR PIPING PLAN
126	.	M202.00	MECHANICAL SECOND FLOOR PIPING PLAN
127	.	M203.00	MECHANICAL ROOF PIPING PLAN
128	.	M401.00	MECHANICAL SCHEDULES
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131	.	M602.00	MECHANICAL DETAILS & CONTROL DIAGRAMS
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136	.	ES002.00	ELECTRICAL SINGLE LINE & RISER DIAGRAMS
137	.	ES100.00	ELECTRICAL SITE PLAN
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SCHEDULE D

Electrical Motor Control Equipment

(Reference: 01 3506, Article 3.8 of the DDC Standard General Conditions)

Requirements for electrical motor equipment may be included in one or more sections of the Specifications for the Contract for the Project. Schedule D set forth below delineates specific information for electrical motor control equipment. In the event of any conflict between the Specifications and this Schedule D, Schedule D shall take precedence; provided, however, in the event of an omission from Schedule D (i.e., Schedule D omits either a reference to or information concerning electrical motor equipment which is set forth in the Specifications), such omission from Schedule D shall have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, shall remain in full force and effect.

DB Disconnect Circuit Breaker (Switch)	P Pilot Light	BG Break Glass Station
TS Thermal Switch	F Firestat	HOA Hand-Off Auto.
MS Magnetic Starter	T Thermostat	PB Push Button Station
CMS Comb. Mag. Starter	AL Alternator	RO Remote "off"

(see next page for text)

Equip. Ident.	Location	# of Units	HP or Watts MFA	Volts and Phase	Control Type: See legend above	Remarks:
ACC-1	Roof	1	115 MFA	208 V / 3phase	CMS	NEMA 3R
ACC-2	Roof	1	15 MFA	208 V / 1 phase	CMS	NEMA 3R
ACC-3	Roof	1	20 MFA	208 V / 1 phase	CMS	NEMA 3R
AC-1A	Training	1	449 W	208 V / 1 phase	DB	NEMA 1
AC-1B	Robot Shop	1	621 W	208 V / 1 phase	DB	NEMA 1
AC-1C	Office	1	364 W	208 V / 1 phase	DB	NEMA 1
AC-1D	Men's Locker	1	69 W	208 V / 1 phase	DB	NEMA 1
AC-1E	Women's Locker	1	69 W	208 V / 1 phase	DB	NEMA 1
AC-2	IT Room	1	46 W	208 V / 1 phase	DB	NEMA 1
AC-3	EMR	1	46 W	208 V / 1 phase	DB	NEMA 1
EF-1	EMR	1	25 Watts	120 V / 1 phase	DB	NEMA 1
EF-2	IT Closet	1	285 Watts	115 V / 1 phase	DB	NEMA 1
VF-1,2	Apparatus	2	3/4 HP	115 V / 1 phase	DB	NEMA 1
GF-1	Apparatus	1	12 HP	208 V / 3 phase	CMS	NEMA 12
GF-2	Apparatus	1	5 HP	208 V / 3 phase	CMS	NEMA 12

ERV-1	Locker Ceiling	1	15 MFA	208 V/ 1 phase	DB	NEMA 1
EUH-1	Apparatus	2	7.5 kW	208 V/ 3 phase	DB	Integral with heater supplied by manufacturer
EUH-2	Apparatus	1	10 kW	208 V/ 3 phase	DB	Integral with heater supplied by manufacturer
EUH-3	Apparatus	1	15 kW	208 V/ 3 phase	DB	Integral with heater supplied by manufacturer
EUH-4	See plans	2	3 kW	208 V/ 1 phase	DB	Integral with heater supplied by manufacturer
EWH-1	Pump/Water Room	1	18 kW	208V/3 Phase	DB	NEMA 3, Built in
SP-1 (PL)	Elevator Pit	1	1/2 HP	115V /1 Phase	DB	NEMA 1
WB-1	Plumbing Room	2	3 HP	208V /1 Phase	DB	NEMA 1
CP-1	Plumbing Room	1	1/12 HP	115V / 1 Phase	DB	NEMA 1
AC-1	Pump/Water Room	1	7.5 HP	208V / 3 Phase	CMS	NEMA 12
SP-1 (Spr.)	Pump/Water room	1	25 HP	208V / 3 Phase	DB	NEMA1
JP-1	Pump/Water Room	1	¾ HP	208/3 phase	DB	NEMA1

SCHEDULE E
Separation of Trades

NOT USED FOR SINGLE CONTRACTS

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**CONTRACT # 1
GENERAL CONSTRUCTION WORK**

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SECTION 01 91 17

BUILDING ENCLOSURE FUNCTIONAL PERFORMANCE TEST PROTOCOL

PART I – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the project
 1. The Contract Drawings
 2. The Specifications
 3. The General Conditions
 4. The Addendum
 5. The Contract [City of New York Standard Construction Contract]

1.2 SECTION INCLUDES

- A. This section includes functional performance testing requirements for the Building Enclosure systems. Refer to DDC's General Conditions 01 91 13 General Commissioning Requirements for MEP Systems and Section 01 91 15 General Commissioning Requirements for Building Enclosure.

1.3 RELATED WORK

- A. Division 03, 05, 07, 08 and 09 Specification Sections also apply to this section. Where conflicts arise regarding building enclosure testing, this Section shall supersede the other Sections.

1.4 TESTING AGENCY

- A. Building Enclosure Testing Agency should be an independent agency retained by the Contractor, fully accredited by the appropriate governing body for each of the materials, components, or systems to be tested or evaluated for compliance with the requirements of the contract documents as outlined below in sections 1.7 and 1.8, and as directed by the BECA. Accreditations to include American Architectural Manufacturers Association (AAMA), American National Standards Institute (ANSI), International Accreditation service, Inc. (IAS), Safety Glazing Certification Council (SGCC), and Window and Door Manufacturers Association (WDMA).
- B. Submit BETA qualifications for testing indicated for acceptance by the Commissioner.

1.5 COORDINATION

- A. Functional Performance Team members shall consist of:
 1. Commissioning Agent (CxA)
 2. Building Enclosure Commissioning Agent (BECA)
 3. Building Enclosure Testing Agent (BETA)
 4. Commissioner
 5. Contractor and all Building Enclosure Sub-Contractors



- B. Management: The Contractor shall hire the BETA. The Commissioner shall direct and coordinate the activities of the BETA, as guided by the BECA. All interactions between the BECA and the Contractor are to be coordinated by the Commissioner.
- C. Scheduling:
 - 1. The Contractor and BETA shall work with the BECA and Commissioner to establish a functional performance testing schedule.

1.6 REPORTING

- A. The Contractor shall provide reports from the BETA for all functional performance testing to the Commissioner and BECA.
- B. BECA shall submit non-compliance and deficiency reports to Commissioner, CxA, and Contractor, as needed.

1.7 PERFORMANCE REQUIREMENTS

- A. The performance criterion below applies to all mock-up and field testing of exterior enclosure components.
- B. Air and Water performance criteria summary table according to each component:

Component	Performance Criteria	
	Air	Water
Glazed Aluminum Curtain Wall Assembly	ASTM E 1186 (4.2.6) – No major air leaks. A major leak is defined as air and smoke are visible and easily detectable by hand within one inch of the leak location(s) <i>DIAGNOSTIC TESTING</i>	AAMA 501.2 – No leakage when tested under a calibrated water spray at 30 psi. <i>2 TESTS @ EACH FENESTRATION TYPE, LOCATION PER COMMISSIONER</i>
	ASTM E 783 – Maximum air leakage of 0.06 cfm/ft at an air pressure differential of 6.24 psf <i>2 TESTS @ EACH FENESTRATION TYPE, LOCATION PER COMMISSIONER</i>	
Aluminum Window Assemblies	ASTM E 1186 (4.2.6) – No major air leaks. A major leak is defined as air and smoke are visible and easily detectable by hand within one inch of the leak location(s) <i>DIAGNOSTIC TESTING</i>	AAMA 501.1/ ASTM E 1105 - No evidence of water penetration when tested under a pressure difference equivalent to the greater of 20% of the maximum positive pressure in zone 5 of the ASCE 07 wind load calculations or 20% of the positive wind tunnel recorded pressure but not less than 6.24 psf.
	ASTM E 783 – Maximum air leakage of 0.1 cfm/ft at an air pressure differential of 6.24 psf <i>2 TESTS @ EACH</i>	



	<i>FENESTRATION TYPE, LOCATION PER COMMISSIONER</i>	<i>2 TESTS @ EACH FENESTRATION TYPE, LOCATION PER COMMISSIONER</i>
Unit Skylights	ASTM E 783 – Maximum air leakage of 0.20 cfm/ft at an air pressure differential of 1.57 psf <i>2 TESTS @ EACH FENESTRATION TYPE, LOCATION PER COMMISSIONER</i>	AAMA 501.1/ ASTM E 1105 - No evidence of water penetration when tested under a pressure difference equivalent to the greater of 20% of the maximum positive pressure in zone 5 of the ASCE 07 wind load calculations or 20% of the positive wind tunnel recorded pressure but not less than 6.24 psf. <i>2 TESTS, LOCATION PER COMMISSIONER</i>
	ASTM E 1186 (4.2.6) – No major air leaks. A major leak is defined as air and smoke are visible and easily detectable by hand within one inch of the leak location(s) <i>DIAGNOSTIC TESTING</i>	AAMA 501.2 – No leakage when tested under a calibrated water spray at 30 psi. <i>2 TESTS, LOCATION PER COMMISSIONER</i>
Air Barrier Assemblies	ASTM E 1186 (4.2.7) – Pass/fail criteria shall be no bubbles observed in the leak detection liquid. <i>2 TESTS @ EACH ANCHOR TYPE, LOCATION PER COMMISSIONER</i>	AAMA 501.1/ ASTM E 1105 – Test inconjunction with adjacent fenestration. No uncontrolled water leakage when tested under a pressure as defined in fenestrations above. <i>TEST IN CONJUNCTION WITH FENESTRATION.</i>
	ASTM E 1186 (4.2.6) – No major air leaks. A major leak is defined as air and smoke are visible and easily detectable by hand within one inch of the leak location(s) <i>2 TESTS @ EACH ANCHOR TYPE, LOCATION PER COMMISSIONER</i>	
	ASTM E 783 – Test inconjunction with adjacent fenestration. Air leakage criteria to match fenestration criteria above. <i>TEST IN CONJUNCTION WITH ASTM E 1105</i>	



Roofing Systems	ASTM E 1186 (4.2.7) – Pass/fail criteria shall be no bubbles observed in the leak detection liquid. <i>2 TESTS @ EACH ANCHOR TYPE AND SEAMA, LOCATION PER COMMISSIONER</i>	ASTM D7877 - Electronic Leak Detection (ELD), or
		ASTM C1153 - No wet insulation observed. Verify suspicious areas with test cuts. <i>IR SCAN @ 100% OF THE SYSTEM</i>

- C. Water leakage is only acceptable if all of the following conditions are satisfied:
 - 1. Water is contained and drained to the exterior.
 - 2. There is no wetting of a surface that is visible to the building occupants.
 - 3. There would be no staining or other damage to the completed building or finishes.

- D. Where testing indicates that performance requirements are not met, the Contractor shall repair or replace the failed section and a re-test conducted. Any repairs should be conducted with inspection by the BECA. Re-testing shall be conducted by the BETA at no additional cost to the City.

- E. In addition to re-testing, failed tests shall typically result in testing of an additional specimen by the Contractor at the discretion of the Commissioner and at no additional cost to the City. Testing shall be concluded only when satisfactory results are achieved.

1.8 FIELD TEST REQUIREMENTS

- A. All functional performance tests shall be conducted to project performance requirements as set forth in the Construction Documents.

- B. The baseline testing defined below is included in the contract and shall be performed at no additional cost to the City.

- C. Where testing indicates that performance requirements are not met, the Contractor shall repair or replace the failed section and a re-test shall be conducted at no additional cost to the City. Any repairs shall be conducted with inspection by the BECA. Re-testing shall be conducted by the BETA at no additional cost to the City.

- D. In addition to re-testing, failed tests shall typically result in testing of an additional specimen by the Contractor at a location selected by the BECA at no additional cost to the City. Testing shall be concluded only when satisfactory results are achieved. Refer to DDC’s General Conditions Section 01 91 13 General Commissioning Requirements for MEP Systems and Section 01 91 15 General Commissioning Requirements for Building Enclosure.



- E. The following shall be performed during the construction phase at the discretion of the Commissioner and BECA:
1. Air Barrier Testing:
 - a. The performance criteria and test pressures for each test method shall be the same as the corresponding test outlined above. Large scale field testing includes the following baselin testing.
 - b. ASTM D4541: Adhesion testing of self-adhered and fluid applied air barriers.
 - 1) Allowable: All air barriers to achieve a minimum adhesion of 16 psi (sheathing) and/or 30 psi (concrete / masonry).
 - 2) Testing Extent: Perform periodic testing for each substrate, but no less than 2 (two) representative tests for each substrate per season to confirm results from mockup phase.
 2. Sealant Testing:
 - a. ASTM C1521, Pull testing of field installed weatherproofing sealants
 - 1) Allowable: Pass/Fail criteria shall be the adhesive failure of the joint.
 - 2) Testing extent: One (1) test for each joint type per 1000 lineal ft. installed
 - b. ASTM C1401-14, Guide for Structural Sealant Glazing; Method A Hand Pull Tab (Destructive).
 - 1) Allowable: Pass/Fail criteria shall be the adhesive failure of the joint.
 - 2) Testing extent: One (1) test for each joint type per 1000 lineal ft. installed.
 - c. ASTM C1193-16, Guide for Use of Joint Sealants: Field-Applied Sealant Joint Hand Pull Tab
 - 1) Allowable: Pass/Fail criteria shall be the adhesive failure of the joint.
 - 2) Testing extent: One (1) test for each joint type per 1000 lineal ft. installed.
- F. In the event of water leakage through the test sample either during pre-testing or final testing; additional isolation testing shall be conducted to best determine the location of the water infiltration as required.
- G. Failure of any tests listed above shall result in subsequent repair and retesting of the failed specimen and the Commissioner's option to test an addition specimen.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 91 17



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SECTION 02 41 16.13

BUILDING DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Demolition and removal of existing building.
2. Disconnecting and capping existing abandoned utility lines.
3. Removal of debris.
4. Filling below grade voids.
5. Protection of existing curbs and sidewalks.
6. Temporary covered passageways.
7. Rodent control.
8. Maintain (re-route, shore, etc.) all existing utilities and facilities to adjacent buildings which are to remain.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Prior to beginning work, prepare a careful study of the building to be demolished and map out a definite plan of procedure before demolition is begun, for review of the Commissioner.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. The Contractor must be responsible for the engineering of any and all required support of excavation (means and methods) and must retain the services of a Professional Engineer licensed in the State of New York to provide signed and sealed drawings for submission to the New York City Department of Buildings.



1.5 JOB CONDITIONS

- A. Buildings and other structures to be demolished will be vacated and discontinued in use prior to the start of the work.
- B. Condition of Structures
 - 1. The City of New York assumes no responsibility for the actual condition of structures to be demolished.
 - 2. Conditions existing at the time of inspection for bidding purposes will be maintained by the City of New York insofar as practicable.
- C. Partial Removal
 - 1. Items of salvageable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.
 - 2. Storage or sale of removed items on the site will not be permitted.
- D. Explosives: The use of explosives will not be permitted.
- E. Protection
 - 1. Provide interior and exterior shoring, bracing, or supporting to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor must engage a Professional Engineer licensed in the State of New York to advise on bracing, shoring, underpinning, or other structural requirements. The Contractor must bear all responsibility for prevention of movement or other structural fault.
- F. Utilities
 - 1. Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.
 - 2. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by Commissioner. Provide temporary services during interruptions to existing utilities, as acceptable to Commissioner.
 - 3. The Contractor must arrange to shut off utilities serving the structure. Disconnect and seal the abandoned utilities before starting demolition operations. Coordinate all work with Con Edison.

PART 2 PRODUCTS

Not Used



PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 DEMOLITION

A. Pollution Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level.
 - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
2. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of the work.
3. Provide drainage for temporary water use.

B. Building Demolition

1. Demolish building completely and remove from the site. Refer to drawings for scope of demolition.
2. Proceed with demolition in a systematic manner, from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members on lower levels.
3. Demolish concrete and masonry in small sections.
4. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.
5. Break up and remove concrete slabs on grade at street level.
6. Locate demolition equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. General

1. Remove from the site debris, rubbish, and other materials resulting from demolition operations that are not acceptable as fill material.
2. Burning of removed materials from demolished structures will not be permitted on the site.



- B. Removal: Transport materials removed from demolished structures and legally dispose of off site. Leave the site in an orderly condition to the approval of the Commissioner.

END OF SECTION 02 41 16.13



**SECTION 028013 – GENERAL CONTRACTOR WORK
NOVEMBER 2017 VERSION**

ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

1.01 SCOPE FOR ASBESTOS ABATEMENT WORK

- A. The "General Conditions" apply to the work of this Section.
- B. The asbestos abatement contractor shall remove asbestos containing materials as needed to perform the other work of this Contract when discovered during the course of work. When required, the asbestos abatement contractor shall replace the ACM with non-asbestos containing materials. An allowance of **\$15,000.00** for the **General Contractor** is herein established for this incidental work when so ordered and authorized by the Commissioner.
- C. All work shall be done in accordance with the applicable provisions of the rules and regulations of the asbestos control program as promulgated by Title 15 Chapter I of RCNY and New York State Department of Labor Industrial Code Rule 56 cited as 12 NYCRR Part 56, whichever is more stringent as per latest amendments to these laws and as modified herein by these specifications.
- D. All disposal of asbestos contaminated material shall be per Local Law 70/85.
- E. The asbestos abatement contractor's attention is directed to the fact that certain methods of asbestos abatement are protected by patents. To date, patents have been issued with respect to "negative pressure enclosure" or "negative-air" or "reduced pressure" and "glove bag".
- F. The asbestos abatement contractor shall be solely responsible for and shall hold the Department of Design and Construction and the City harmless from any and all damages, losses and expenses resulting from any infringement by the asbestos abatement contractor of any patent, including but not limited to the patents described above, used by the asbestos abatement contractor during performance of this agreement.
- G. "Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cummingtonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.
- H. Prior to starting, the asbestos abatement contractor must notify the Commissioner of the Department of Design and Construction if he/she anticipates any difficulty in performing the Work as required by these Specifications. The asbestos



abatement contractor is responsible to prepare and submit all filings, notifications, etc. required by all City, State and Federal regulatory agencies having jurisdiction.

The asbestos abatement contractor is responsible for submitting the Asbestos Project Notification Form (ACP-7 Form) to the Department of Environmental Protection, Asbestos Control Program, as per Title 15, Chapter I of RCNY and to the NYSDOL as per Industrial Code Rule 56.

The asbestos abatement contractor is responsible for preparing, and submitting Asbestos Variance Application (ACP-9). If a Variance is required, the asbestos abatement contractor is responsible to retain a NYSDOL Asbestos Project Designer, as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required variance.

The general contractor is responsible for preparing and submitting an Asbestos Abatement Permit and/or Work Place Safety Plans (WPSP) that may be required for the completion of the Contract or incidental work. If such plans are required, the general contractor is responsible for retaining a registered design professional as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required plans.

The asbestos abatement contractor is responsible for the submission of all required documents to the NYCDEP to acquire the appropriate Asbestos Project Conditional Closeout (ACP-20) and/or Asbestos Project Completion Forms (ACP-21) on a timely basis for the completion of the incidental work encountered under this contract.

The asbestos abatement contractor will be required to attend an on-site job meeting with the Construction Project Manager prior to the start of work to examine conditions and plan the sequence of operations, etc.

The asbestos abatement contractor shall have a NYSDOL/NYCDEP Asbestos Supervisor onsite to oversee the work and conduct a final visual inspection as required by both Title 15, Chapter 1 of the RCNY and NYSDOL Industrial Code Rule 56.

- I. All work shall be done during regular working hours unless the asbestos abatement contractor requests authorization to work in other than regular working hours and such authorization is granted by the Commissioner. (Regular work hours are those hours during which any given facility, in which work is to be done, is customarily open and functioning, normally between the hours of 8:00 A.M. and 4:00 P.M. Monday - Friday.) If such work schedule is authorized by the Commissioner, the work shall be done at no additional cost to the City.
- J. The Commissioner may order that work be done in other than regular working hours as herein by defined and this order may require the asbestos abatement



contractor to pay premium or overtime wages to complete the work. If the Commissioner orders work in other than regular working hours, the asbestos abatement contractor shall multiply the unit price for that portion of the work requiring premium wages by 1.50 when computing payment in accordance with Paragraph 1.09. All requests for premium payment must be supported by certified payroll sheets and field sheets approved by the Construction Project Manager.

1.02 QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR

- A. Requirements: The asbestos abatement contractor must be approved through the Department's Request for Subcontractor Approval, administered by the Agency Chief Contracting Office (ACCO), Vendor Integrity Unit. The asbestos abatement contractor must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (6) below. Such documentation shall include without limitation, all required licenses, certificates, and documentation.
1. The asbestos abatement contractor must, whether an individual, corporation, partnership, joint venture or other legal entity, demonstrate for the three year period prior to the work that it has been licensed by the New York State Department of Labor (NYSDOL), as an "Asbestos Abatement Contractor". The asbestos abatement contractor shall submit copies of the asbestos abatement contractors NYSDOL License for the past three years
 2. The asbestos abatement contractor must, for the three-year period prior to the work, have been in the business of providing asbestos abatement services as a routine part of its daily operations.
 3. The asbestos abatement contractor proposing to do asbestos abatement work must be thoroughly experienced in such work and must submit a list of five (5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least \$1,000,000 in each of the three years.
 4. For each project submitted to meet the experience requirements set forth above, the asbestos abatement contractor must submit the following information for the project; name and location of the project; name title and telephone number and email address of the owner or the owner's representative who is familiar with the asbestos abatement contractor's work; brief description of the scope of work completed as a prime or sub-asbestos abatement contractor; amount of contract or subcontract and the date of completion.
 5. The asbestos abatement contractor must demonstrate that it has the financial resources, certified supervisory personnel and equipment



necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The asbestos abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract. The Department may also conduct an inspection of the asbestos abatement contractor's facility to verify if the contractor has equipment and staffing to perform the work.

6. The asbestos abatement contractor must submit a copy of their Corporate Health and Safety Plan for review and acceptance. A Job Hazard Analysis (JHA) for the specific work conducted must be included.
- B. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof. Provide materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.
- C. Site Investigation: Asbestos abatement contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site conditions affecting the work, including, but not limited to (1) through (5) below. The asbestos abatement contractor will attend a walkthrough site inspection with the department's Project Manager and the Third-Party Air Monitor prior to the work. Such walkthrough will be scheduled at the Department's convenience.
1. Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in accessing or removing the material.
 2. Handling, storage, transportation and disposal of the material.
 3. Availability of qualified and skilled labor.
 4. Availability of utilities.
 5. Exact quantities of all materials to be disturbed and/or removed

1.03 ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

The asbestos abatement contractor will visit the subject location within one (1) working day of notification to ascertain actual work required. If the project is identified as being "urgent", then work shall commence no later than 48 hours from the time of notification. In this event, the asbestos abatement contractor shall immediately notify when applicable EPA NESHAPS Coordinator, NYSDOL Asbestos Control Bureau and NYCDEP



Asbestos Control Program of start of the work and file the necessary Asbestos Notifications and any applicable Variance Applications with the regulatory agencies cited above.

In the event that the project is not classified as "urgent" the asbestos abatement contractor shall notify the EPA NESHAPS Coordinator, NYSDOL and NYCDEP by submitting the requisite asbestos project notification forms, postmarked 10 days before activity begins if 260 linear feet or more and/or 160 square feet or more of asbestos containing material will be disturbed.

The following information must be included in the notification:

- A. Name and address of building City or operator;
- B. Project description:
 - 1. Size - square feet, number of linear feet, etc;
 - 2. Age - date of construction and renovations (if known);
 - 3. Use - i.e., office, school, industrial, etc.
 - 4. Scope - repair, demolition, cleaning, etc.
- C. Amount of asbestos involved in work and an explanation of techniques used to determine the amount;
- D. Building location/address, including Block and Lot numbers;
- E. Work schedule including the starting and completion dates;
- F. Abatement methods to be employed;
- G. Procedures for removal of asbestos-containing material;
- H. Name, title and authority of governmental representative sponsoring project.

1.04 WORK INCLUDED IN UNIT PRICE

The asbestos abatement contractor will be paid a basic unit price of **\$25.00** per square feet for the removal and disposal of asbestos containing material and replacement of the same with non-asbestos containing materials.

Unit price shall include all costs necessary to do the work of this Contract, including but not limited to: labor, materials, equipment, utilities, disposal, insurance, overhead and profit.



1.05 AIR MONITORING – ASBESTOS ABATEMENT CONTRACTOR

- A. “Air Sampling” shall mean the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of Standard and Technology which are utilized for lower detectability and specific fiber identification.
- B. Air monitoring of asbestos abatement contractor’s personnel will be performed in conformance with OSHA requirements, (All costs associated with this work are deemed included in the unit price.).
- C. Qualifications of Testing Laboratory:

The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

Note: Work area air testing and analysis before, during and upon completion of work (clearance testing) will be performed by a Third Party Air Monitor under separate Contract with the City.

1.06 THIRD PARTY MONITORING AND LABORATORY

- A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.
- B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM).
- C. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the asbestos abatement contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.
- D. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the asbestos abatement contractor.



1.07 PAYMENT REQUEST DOCUMENTATION

- B. The following information shall be included for each payment request:
1. Description of work performed.
 2. Linear footage and pipe sizes involved.
 3. Square footage for boiler & breaching insulation removed.
 4. Square footage of non pipe and boiler areas removed, patched, enclosed, sealed, or painted.
 5. Square footage of encapsulation, sealing, patching, and painting involved.
 6. Total cost associated with compliance with the assigned task.
 7. Architectural, Electrical, HVAC, Plumbing, etc. work incidental to the Asbestos Abatement Work.
 8. A certified copy (in form 4312-39) to the Comptroller or Financial Officer of the New York City to the effect that the financial statement is true.
 9. A signed copy (in form 6506q-6) of certificate of compliance with non-discriminatory provisions of the Contract.
 10. Attach a copy of valid workmen compensation insurance.
 11. Valid asbestos insurance per occurrence.
 12. General liability insurance when required.
- C. Each payment request shall include a grand total for all work completed that billing period, the landfill waste manifests and a copy of waste transporter permit. The Department of Design and Construction will inspect the work performed, review the cost and approve or disapprove requests for payment.
- D. EXPOSURE LOG: With this final payment, the asbestos abatement contractor shall submit a listing of the names and social security numbers of all employees actively engaged in the abatement work of this Contract. This list shall include a summary showing each part of the abatement work in which the employee was engaged and the dates thereof.

1.08 QUANTITY CALCULATIONS

In order to determine the square footage involved for the various pipe sizes of pipe insulation that might be encountered, the following table is to be used.



PIPE INSULATION SIZE O.D.	PIPE SIZE O.D.	SQUARE FOOTAGE PER LINEAR FOOT
2-1/2"	1/2"	0.65
2-3/4"	3/4"	0.72
3"	1"	0.79
3-1/4"	1-1/4"	0.85
3-1/2"	1-1/2"	0.92
4"	2"	1.05
4-1/2"	2-1/2"	1.18
5"	3"	1.31
6"	3-1/4"	1.57
7"	3-1/2"	1.83
8"	4"	2.09
9"	5"	2.36
10"	6"	2.62
12"	8"	3.14
14"	10"	3.67
16"	12"	4.19
18"	14"	4.71

1.09 METHOD OF PAYMENT

Payment shall be made in accordance with Items A through R below. Payment shall be calculated based on the actual quantity of the item performed by the asbestos abatement contractor, times the unit price specified below. Credits may apply to certain times, as specified below.

A. REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING PIPE INSULATION: Actual linear footage, multiplied by the square footage factor listed for the respective pipe size in Section 1.08, multiplied by the unit price in Section 1.04.

EXAMPLE: 100 lin.ft. of 1/2" pipe and 100 lin.ft. of 6" pipe, including elbows, tees. Flanges, etc.

$$100 \times 0.65 = 65 \text{ sq.ft.} \quad 65 \times \text{unit price} = \text{Payment}$$

$$100 \times 2.62 = 262 \text{ sq.ft.} \quad 262 \times \text{unit price} = \text{Payment}$$

B. REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER INSULATION: (all types including Silicate Block and including the removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

EXAMPLE: Item B. removal and replacement of 1000 S.F. of boiler insulation (incl. Silicate block)



1000 S.F. X (1.5) X the Unit Price = Payment

- C. **REMOVAL, DISPOSAL AND REPLACEMENT OF TANK INSULATION:** (all types including removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.
- D. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER UPTAKE, & BREACHING INSULATION:** (all types including stiffening angles and wire lath) Payment shall be made at 2.0 times the unit price per square foot.
- E. **REMOVAL, DISPOSAL AND REPLACEMENT OF DUCT INSULATION:** Payment shall be made at 1.0 times the unit price per square foot.
- F. **REMOVAL, DISPOSAL AND REPLACEMENT OF SOFT ASBESTOS CONTAINING MATERIAL:** (Including sprayed-on fire proofing and sound proofing) Payment shall be made at 1.0 times the unit price per square foot of surface area. Area of irregular surfaces must be calculated and confirmed with DDC representative.
- G. **ACOUSTIC PLASTER REPAIR AND/OR ENCAPSULATION:** Payment shall be made at 0.5 times the unit price per square foot.
- H. **PATCHING OR REPAIR** of items listed in A through F will be paid at 0.33 times the unit price per square foot.
- I. **REMOVAL, DISPOSAL AND REPLACEMENT OF WATERPROOFING ASBESTOS CONTAINING MATERIAL:** (including friable and non-friable waterproofing material from interior and exterior walls, floors, foundations, penetrations, louvers, vents and openings other than windows, doors and skylights) Payment shall be made at 0.5 times the unit price per square foot.
- J. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING ELECTRICAL WIRING INSULATION:** (including friable and non-friable wiring insulation) Payment shall be made at 0.33 times the unit price per square foot.
- K. **PAINTING:** Payment shall be made at 0.05 times the unit price per square foot.
- L. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING PLASTER:** from ceilings and walls, including any wire lath and disposal as asbestos containing waste. Payment shall be made at 0.80 times the unit price per square foot.
- M. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING FLOOR TILES, CEILING TILES, TRANSITE PANELS:** (including any adhesive, glue, mastic and/or underlayment) and disposal as asbestos containing waste. Payment shall be made at 0.40 times the unit price per square foot. If multiple



layers are discovered, each additional layer shall be paid at 0.20 times the unit price per square foot.

- N. **ADDITIONAL CLEAN UP/HOUSEKEEPING OF WORK AREA:** (excluding pre-cleaning of work area required by regulations) HEPA vacuuming and wet cleaning of asbestos contaminated surface. Payment shall be made at 0.20 times the unit price per square foot. When GLOVE BAG is employed to remove ACM, cost of HEPA vacuuming and wet cleaning of floor area up to 3 feet on each side of glove-bag shall be included in unit price and no extra payment will be made.
- O. **REMOVAL, DISPOSAL OF ASBESTOS-CONTAINING ROOFING MATERIAL:** including mastic, flashing and sealant compound and provide temporary asbestos-free roof covering consisting of one layer of rolled roofing paper sealed with asphaltic roofing compound. Payment shall be made at 0.8 times the unit price per square foot. Credit at a rate of 0.33 times the unit price will be taken for each square foot of temporary roof covering which the asbestos abatement contractor is directed not to install.
- P. **PICK-UP AND DISPOSAL OF GROSS DEBRIS:** (excluding any waste generated from abatement under Item A-R) at a rate of \$150 per cubic yard for asbestos contaminated waste and \$75 per cubic yard for non-asbestos contaminated waste. This cost includes all labor and material cost associated with work.
- Q. **REMOVAL OF ASBESTOS-CONTAINING BRICK, BLOCK, MORTAR, CEMENT OR CONCRETE:** along with all surfacing materials including wire lath and/or other supporting structures and disposal as ACM waste. Payment shall be made at a rate of \$25.00 per cubic foot of material removed.
- R. **REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING WINDOW/DOOR CAULKING:** including friable and non-friable caulking, weather-stripping, glazing, sealants or other waterproofing materials applied to windows, doors, skylights, etc. Payment shall be made at the rate of \$400.00 per opening regardless of size or configuration. This cost includes labor, consumable materials, set-up/breakdown, removal and disposal, as required.

Note 1: CREDIT: For items listed in A through F, a credit at a rate of 0.33 times the unit price, times the respective multiplier (for each item) will be taken for each square foot of insulation which the asbestos abatement contractor is not directed to reapply.

Note 2: MINIMUM PAYMENT: The minimum payment per call at any individual job sites or various job sites during the same day will be eight hundred dollars (\$800.00).

Note 3: All payments shall be made as described in paragraph 1.09 herein.

Note 4: WORKING HIGHER THAN 12 FEET ABOVE FLOOR LEVEL OR WORK REQUIRING COMPLEX SCAFFOLDING OR CONSTRUCTION WORK



PLATFORMS: Provisions are made in this Contract to compensate the asbestos abatement contractor for work performed in locations that are difficult to access due to work at elevations that are significantly higher than the normal work level. The unit price for these items will be paid at 1.20 times the unit price described in Paragraphs 1.09, A through R for those portions of the work that are more than twelve (12) feet above the grade for that would be judged as the normal working level.

1.10 GUARANTEE

- A. Work performed in compliance with each task shall be guaranteed for a period of one year from the date the completed work is accepted by the Department of Design and Construction.
- B. The Commissioner of The Department of Design and Construction will notify the asbestos abatement contractor in writing regarding defects in work under the guarantee.

1.11 OCCUPANCY OF SITE NOT EXCLUSIVE

Attention is specifically drawn to the fact that contractors, performing the work of other Contracts, may be brought upon any of the work sites of this Contract. Therefore, the asbestos abatement contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other contractors who may be brought upon any site of the work of this Contract. This paragraph applies to those areas outside the regulated Work Area as defined by Title 15, Chapter I of RCNY.

1.12 SUBMITTALS

- A. Pre-Construction Submittals:
 - 1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the asbestos abatement contractor shall present three copies of the following items:
 - a. asbestos abatement contractor's scope of work, work plan and schedule.
 - b. Asbestos project notifications, approved variances and plans to Government Agencies.
 - c. Copies of Permits, clearance and licenses if required.
 - d. Schedules: the asbestos abatement contractor shall provide to the Construction Project Manager a copy of the following schedules for



approval. Once approved, schedules shall be maintained and updated as received. asbestos abatement contractor shall post a copy of all schedules at the site:

- (1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.
 - (2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.
 - (3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.
- e. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number to nearest hospital) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.
- f. Safety Data Sheets (SDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until SDS are reviewed.
- g. Worker Training and Medical Surveillance: The asbestos abatement contractor shall submit a list of the persons who will be employed by him /her to perform the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
- h. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.
- (1) The asbestos abatement contractor shall provide a permanently bound log book of minimum 8-1/2" x 11" size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall



contain on title page the project name, name, address and phone number of the asbestos abatement contractor; name, address and phone number of asbestos abatement contractor and City's third party air monitoring firm; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved for entry into the Work Area.

- (2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the asbestos abatement contractor shall submit the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

- i. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

B. During Construction Submittals:

1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.
2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.
3. Floor plans indicating asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project Manager.
4. All asbestos abatement contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the asbestos abatement contractor shall present two copies of the following items, bound and indexed:



1. Lien Waivers from asbestos abatement contractor, sub-asbestos abatement contractors and Suppliers,
2. Daily OSHA air monitoring results,
3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,
4. Field Sign-In/Sign-Out Logs for every shift,
5. Copies of all Building Department Forms and Permits,
6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,
7. All Warranties as stated in the Specifications,
 - a. Fully executed disposal certificates and transportation manifest.
8. Project Record: The asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:
 - a. Copies of licenses of all asbestos abatement contractors involved in the project;
 - b. Copies of NYCDEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;
 - c. Copies of all project notifications and reports filed with NYCDEP, NYSDOL and USEPA for the project, with any amendments or variances;
 - d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;
 - e. A copy of the air sampling log and all air sampling results;
 - f. A copy of the abatement asbestos abatement contractor's daily log book;



- g. Copies of all asbestos waste manifests;
- h. A copy of all Project Monitor's Reports (ACP-15).
- i. A copy of each ATR-1 Form completed for the asbestos project (if required).
- j. A copy of each Asbestos Project Conditional Closeout Report (ACP-20) if required.
- k. A copy of the Asbestos Project Completion Form (ACP-21).

1.13 PROTECTION OF FURNITURE AND EQUIPMENT

Cover all furniture and equipment that cannot be removed from Work Areas. Movable furniture and equipment will be removed from Work Areas by the asbestos abatement contractor prior to start of work. At the conclusion of the work (after final air testing), the asbestos abatement contractor will remove all plastic covering on walls, floors, furniture, equipment and reinstall furniture and equipment. He shall remove and store all sheaths, curtains and drapes, and reinstall same following final clean up.

1.14 UTILITIES

A. General:

All temporary facilities shall be subject to the approval of the Commissioner. Prior to starting work at any site, locations and/or sketches (if required) of temporary facilities must be submitted to the Construction Project Manager for the required approval.

B. Water:

The Department of Design and Construction will furnish all water needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. However, it is the responsibility of the asbestos abatement contractor to ensure that hot water is provided for showering in the decontamination unit. The asbestos abatement contractor shall furnish, install and maintain any needed equipment to meet these requirements at his own expense.

C. Electricity:

The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the asbestos abatement contractor in a building, under their jurisdiction. The asbestos abatement contractor is responsible for routing the electric power to the abatement Work Area.



All temporary lighting and temporary electrical service for Work Area shall be in weatherproof enclosures and be ground fault protected.

- D. In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and Construction. Utilities will be provided at no cost to the asbestos abatement contractor. However, it is the asbestos abatement contractor's (or the general contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

1.15 FEES

The asbestos abatement contractor shall be responsible for any and all fees or charges imposed by Local, State or Federal Law, Rule and Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the date of the Bid opening.

END OF SECTION

SECTION 03 30 00

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Foundation systems including footings, piles, pile caps, walls, beams, piers, and similar concrete.
2. Slabs on grade.
3. Structural slabs on grade.
4. Cast-in-place slabs, beams, and walls.
5. Furnishing and installing all required anchors and inserts.
6. Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other trades for casting into the concrete and cleaning of same after stripping of forms.
7. Protection of all inserts, anchors, hangers, sleeves and supports furnished and set by others for the attachment of other work to the concrete, or required to permit the passage of other work through the concrete.
8. Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting devices.
9. Erection and removal of all formwork required to properly complete the work.
10. Finishing of all concrete work as hereinafter specified.
11. Curing and protection of all concrete work.
12. Site concrete consisting of curbs, walks, pads, boxes and the like as shown on the drawings.
13. Floor sealers and dust-proofing of all areas exposed and/or covered with carpet.
14. Cutting, patching, grouting, restoring and pointing up as required.
15. Vapor barrier system below slabs on grade.
16. Under slab drainage course.
17. Dewatering.
18. Waterproofing.
19. Grouting of all beam bearing plates and column base plates.
20. Equipment pads as required.
21. All other work and materials as may be reasonably inferred and needed to make the work of this section complete.
22. Waste Management

B. Related Requirements:

1. DDC General Conditions “Construction Waste Management and Disposal”
2. Section 04 20 00 “Unit Masonry”
3. Section 05 12 00 “Structural Steel Framing”
4. Section 05 31 00 “Steel Decking”
5. Section 05 50 00 “Metal Fabrications”
6. Section 06 20 00 “Finish Carpentry”
7. Section 07 13 00 “Foundation Waterproofing”
8. Section 07 92 00 “Joint Sealants”

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

B. Product Data: Submit data for proprietary materials and items, including the following:

1. Reinforcement and forming accessories
2. Admixtures
3. Patching compounds
4. Waterstops
5. Joint systems
6. Curing compounds
7. Dry-shake finish materials
8. Others items as requested by the Commissioner.

C. Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. The shop drawings must be prepared by a Professional Engineer licensed in the State of New York and checked by the contractor prior to submission.

1. The shop drawings must show construction, contraction and isolation joint locations and the added reinforcement required at same.
2. Obtain and coordinate information for sleeves and openings in concrete, which are required for the work of other trades. Make coordinated drawings showing size and location of openings and sleeves and incorporate this information on the reinforcing drawings.
3. Only those splices indicated on the approved shop drawings will be permitted.
4. Provide elevations of all foundation walls and other structural elements to a minimum 1/4" scale.

D. Shop Drawings Formwork: Submit shop drawings for fabrication and erection of specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually. Commissioner’s review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor’s responsibility,

prepared by or under the supervision of a qualified Professional Engineer licensed in the State of New York detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 1. Location of construction joints is subject to approval of the Commissioner.
- F. Contraction Joint Layout: Indicate proposed contraction joints required per applicable codes and drawings.
 1. Location of contraction joints is subject to approval of the Commissioner.
- G. Samples: Submit samples of materials as requested by Commissioner, including names, sources and descriptions.
- H. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.
- I. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Commissioner and Manufacturer, certifying that each material item complies with, or exceeds, specified requirements must sign material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- J. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures, when applicable.
- K. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.
- L. Certified recycled steel content. Provide cut sheets clearly indicating whether the rebar used meets the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
- M. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.
- N. Recycled Aggregate: Provide laboratory reports indicating that aggregate conforms to ASTM C33 for structural concrete or ASTM D1241-00 for sub-base material. Provide cut sheets clearly indicating the source, total weight and volume of the recycled aggregate. If aggregate provided is a mix of virgin and recycled aggregates obtain a written affidavit from the manufacturer stating the recycled content percentage
- O. VOC content for curing compounds, sealants and release agents: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each curing compound, sealant, hardener and release agent used highlighting VOC contents. VOC content must be less than or equal to limits stated under "PRODUCTS".

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS-98 D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. New York City Building Code, 2008
 - 2. ACI 117 “Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary.”
 - 3. ACI 211.1 “Standard Practice for Selecting Proportions for Normal, Heavyweight and mass concrete.”
 - 4. ACI 211.2, “Standard Practice for Selecting Proportions for Structural Lightweight Concrete.”
 - 5. ACI 214R, “Evaluation of Strength Test Results of Concrete.”
 - 6. ACI 232.2R, “Use of Fly Ash in Concrete.”
 - 7. ACI 233R, “Guide to Use of Slag Cement in Concrete and Mortar.”
 - 8. ACI 234, “Guide for the Use of Silica Fume in Concrete.”
 - 9. ACI 301 “Specifications for Structural Concrete.”
 - 10. ACI 302.1R “Guide for Concrete Floor and Slab Construction.”
 - 11. ACI 304R, “Guide for Measuring, Mixing, Transporting and Placing Concrete.”
 - 12. ACI 305R “Hot Weather Concreting.”
 - 13. ACI 306.1-90 “Standard Specification for Cold Weather Concreting.”
 - 14. ACI 308.1 “Standard Specification for Curing Concrete.”
 - 15. ACI 309R, “Guide for Consolidation of Concrete.”
 - 16. ACI 311.4R, “Guide for Concrete Inspections.”
 - 17. ACI 315, “Details and Detailing of Concrete Reinforcement.”
 - 18. ACI 318 “Building Code Requirements for Structural Concrete and Commentary.”
 - 19. ACI 347 “Guide to Formwork of Concrete.”
 - 20. Concrete Reinforcing Steel Institute, (CRSI) “Manual of Standard Practice.”
 - 21. CRSI-WCRSI, “Placing Reinforcing Bars.”
 - 22. AWS D1.4, “Structural Welding Code Reinforcing Steel.”
 - 23. The ACI Field Reference Manual, SP-15 must be kept at the job site, and the practices set forth therein must be strictly adhered to.
 - 24. ASTM Standards as applicable in the building code of New York City and as noted in this specification.
- E. Form TR3: Technical Report Concrete Design Mix: The contractor shall be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design

mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.

- F. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, must be done at Contractor's expense.
- G. Preconstruction Meeting:
1. At least 35 days prior to the start of the concrete construction schedule, the Contractor must conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction. The Contractor must send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
 2. The Contractor must require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
 - a. Contractor's superintendent
 - b. Laboratory responsible for the concrete design mix
 - c. Laboratory responsible for field quality control
 - d. Concrete subcontractor
 - e. Ready-mix concrete producer
 - f. Admixture manufacturer(s)
 - g. Concrete pumping equipment manufacturer.
 3. Minutes of the meeting must be recorded, typed and printed by the contractor and distributed to all parties concerned within 5 days of the meeting. One copy of the minutes must also be transmitted to the following for information purposes:
Commissioner.
 4. The minutes must include a statement by the concrete contractor indicating that the proposed mix design and placing can produce the concrete quality required by these specifications.
 5. A minimum of a 4 cubic yard trial mixture containing all required admixtures must be placed at the job site using the accepted methods of placing, finishing and curing. All applicable tests including slump, strength, air content, permeability, and air content will be performed. This must occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors must be present. The same testing should be done in the laboratory at the same time for comparison. A test sample should be done for each condition that is to be placed.

1.5 PROJECT CONDITIONS

- A. The Contractor, before commencing work, must examine all adjoining work on which this work is in any way dependent for proper installation and workmanship according to the intent of this specification, and must report to the Commissioner any condition which prevents this contractor from performing first class work.

- B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- C. Protect adjacent finish materials against spatter during concrete placement.
- D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, etc., to prevent injury to workmen and others within and about the premises. Also provide all safeguards as required by the 2008 New York City Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.
- E. Procedure of Work: The contractor must stay constantly informed as to the progress of the work in the field, materials and men ready to start work immediately when conditions of preceding work are available or ready, wholly or in part, so as not to delay the progress of building work or to interfere with the progress of work of other trades, and in any event must, within 24 hours after notice from the City of New York, proceed with such work as directed to maintain the uninterrupted progress of the work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct of plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.
 - 1. Use plywood complying with U.S. Product Standard PS-1 “B-B (Concrete Form) Plywood”, Class I, Exterior Grade or better mill oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Preference will go to salvaged or re-used Dimensional Lumber. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Sustainability Requirements For Wood Used For Formwork
 - 1. Salvaged or re-used Dimensional Lumber for Formwork: Provide documentation certifying products are from salvaged wood sources. Provide grading certificate for structural applications. For wood salvage wood resources see GreenSpec.

- D. Form Coatings: Provide VOC compliant commercial formulation form- coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Use biodegradable form release agent listed below or equivalent made from soy or rapeseed oil, or approved equal.
- | | |
|----------------------|-------------------------------------|
| 1. “Bio-Release EF” | Dayton Superior |
| 2. “Soy Form Away” | Cure & Seal by Natural Soy Products |
| 3. “Bio-Form” | Leahy-Wolf Company |
| 4. “Duogard II” | W. R. Meadows, Inc. |
| 5. “Atlas Bio-Guard” | Atlas Construction Supply, Inc. |
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties must not be used. Ties for foundation work must be of snap design with removal cones and water seal washer.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.
- B. Epoxy-Coated Reinforcing Bars and Wire Welded Fabric: ASTM A 775 (as noted on plan and/or in section).
- C. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- D. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, Galvanized.
- E. Welded Deformed Steel Wire Fabric: ASTM A 497, Galvanized.
- F. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 , plain-steel bars, cut true to length with ends square and free of burrs.
- G. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 , plain-steel bars, ASTM A 775/A 775M epoxy coated.
- H. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- I. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.



1. For epoxy coated reinforcement provide plastic protected chairs and plastic ties. All imperfections in the epoxy coating are to be corrected prior to placement of concrete.
 - a. Use recycled plastic rebar supports. Subject to compliance with requirements, provide one of the following, or approved equal:
 - 1) International Plastics Group
 - 2) Eclipse Plastic
 - 3) Inland Concrete Products
2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2), at a spacing not to exceed 4'-0" on center in either direction.

2.3 CONCRETE MATERIALS

- A. Portland cement: ASTM C 150, Type I. Total percentage of Portland Cement is NOT to exceed 75% of the cementitious mix. Use one brand of cement throughout project, unless otherwise acceptable to Commissioner.
 - a. Fly Ash: Cast-in-place concrete must incorporate fly ash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner. Fly Ash must not be used in conjunction with Ground Granulated Blast Furnace Slag.
 - b. Ground Granulated Blast Furnace Slag (GGBF): Cast-in-place concrete must incorporate GGBF as a replacement for at least 40% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner. GGBF must not be used in conjunction with Fly Ash.
 - c. Pozzolans and Slags: These must be completely accounted for in the design mix. Mix design must meet minimum design requirements set in the contract documents. Additional admixtures may be required to meet early strength requirements and alternative cementitious material goals. If a "blended cement" is used which already contains a certain percentage of Pozzolans or Slags this content may offset or entirely satisfy the minimum percentage required.
 - 1) Coal Fly Ash: ASTM C 618 (Class C or Class F): ASTM C 618 (Note: Class F fly Ash will require higher amounts or air entraining ad-mixtures than class C).
 - 2) Blast Furnace Slag: ASTM C989
 - 3) Silica Fume: ASTM C 1240
 - 4) Rice Hull (or "husk") Ash: ASTM C 618 Blended hydraulic cement, as defined by ASTM C 595 or ASTM C 1157
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
 1. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Commissioner.



2. Normal weight Fine Aggregate: washed, inert, natural or manufactured or combination thereof, sand conforming ASTM C33 gradation.
3. Normal weight Coarse Aggregate: well graded crushed stone or washed gravel conforming to ASTM C33, sizes 57 for foundations and 67 for slabs and structure.
 - a. Recycled crushed concrete aggregate in concrete mixes is only to be used with approval of Commissioner. Recycled aggregate must be used only as a substitute for coarse aggregate and must also be washed and well-graded, conforming to ASTM C33.
 - b. For sub-base, slabs on grade and non-structural applications and Recycled Aggregate Materials are NOT required to meet the ASTM C 33 standard. In addition to concrete rubble, glass, porcelain, and tire chips can be used as filler material. Any inert material conforming to ASTM D1241 is acceptable for the applications described in this paragraph.
- C. Water: Free from oils, acids, alkali, organic matter and other deleterious material to conform to ASTM C94. ASTM C94 for gray water use in the production of ready mixed concrete per approval by the Commissioner.
- D. Air-Entraining Admixture: Any material proposed for use as an air-entraining admixture should be tested in conformance with ASTM C 260.
 1. Liquid air-entrainment: Use only agents derived from salts of wood resins. Select from products listed below or approved equal conforming to ASTM C-260.
 - a. "Airmix" Euclid Chemical
 - b. "Darex AEA" W. R. Grace
 - c. "MB-VR" Master Builders
- E. Water-Reducing Admixture: ASTM C 494.
 1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - a. "Polyheed 997" Master Builders
 - b. "Euclid MR" Euclid Chemical
 - c. "WRDA 64" W. R. Grace.
- F. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
 1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - a. "Eucon 37, 1037 or Plastol 5000" Euclid Chemical Co.
 - b. "Rheobuild 1000" Master Builders
 - c. "Glenium 7500" Master Builders
 - d. "Daracem-100" W. R. Grace

- G. Water Reducing, Non-Corrosive Accelerating Admixture: The admixture must conform to ASTM C 494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Accelerating admixtures are not to be used as antifreeze agents. Accelerating admixtures are permitted only upon review by the Commissioner.
1. Products: Subject to compliance with requirements, provide the following, or approved equal:
 - a. "Accelguard 80" Euclid Chemical Co.
 - b. "Daraset" W. R. Grace
 - c. "Pozzutec 20" Master Builders.
- H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.05 percent chloride ions.
1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - a. "Eucon Retarder 75" Euclid Chemical Co.
 - b. "Pozzolith 100XR" Master Builders.
 - c. "Plastiment" Sika Chemical Co.
 - d. "Daratard" W.R. Grace.
- I. Microsilica Admixture must be dry densified or slurry formed. Microsilica must come from the same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source must be required before acceptance by the Commissioner at no cost to the City of New York.
1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - a. "Emsac F 100" Elkem Chemical, Inc.
 - b. "Eucon MSA" Euclid Chemical Co.
 - c. "Force 10,000" W. R. Grace
- J. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.
- K. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Commissioner.
- L. Macro-Fibers: Engineered macro-synthetic fibers.
1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:



- a. "Tuf-Strand SF" Euclid Chemical Co.
- b. "Fibermesh 650" Propex Concrete Systems
- c. "Forta-Ferro" Forta

M. Micro-Fibers: Engineered micro-synthetic fibers.

- 1. Products: Subject to compliance with requirements, provide the following, or approved equal:

- a. "Fiberstrand N": Euclid Chemical Co.
- b. "Fibermesh 150": Propex Concrete Systems
- c. "Ultra-Net" Forta

N. Natural Fiber Reinforced Concrete: Natural fiber reinforced concrete is permitted only upon review by Commissioner. Refer to ACI 544.1R, chapter 5

O. Corrosion Inhibitor: 30% calcium nitrite (where called for in the specifications or on the drawings). Subject to compliance with requirements, provide the following (or approved equal) at 3 gal/cy:

- 1. "Eucon CIA" Euclid Chemical
- 2. "DCI" W. R. Grace
- 3. "Rheocrete CNI" Master Builders.

P. Waterproofing admixture Xypex or approved equivalent must be added to foundation concrete.

Q. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

2.4 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal;

- a. Greenstreak
- b. Williams Products, Inc.
- c. Cetco

- 2. Profile: Flat, dumbbell with center bulb
- 3. Dimensions: 4 inches by 3/16 inch thick

B. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.



1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. BoMetals, Inc.
 - b. Greenstreak
 - c. Paul Murphy Plastics Company
 - d. Vinylex Corp.
 2. Profile: Flat, dumbbell with center bulb
 3. Dimensions: 4 inches by 3/16 inch thick (100 mm by 4.75 mm thick)mm thick
- C. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
1. Products: Subject to compliance with requirements, provide one of the following or approved equal;
 - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP
 - b. CETCO; Volclay Waterstop-RX
 - c. Concrete Sealants Inc.; Conseal CS-231
 - d. Greenstreak; Swellstop
 - e. Henry Company, Sealants Division; Hydro-Flex
 - f. JP Specialties, Inc.; Earth Shield Type 20

2.5 GROUT

- A. Non-Shrink, Non-Metallic Grout: The non-shrink grout must be a factory pre-mixed grout and must conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer must furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency must achieve 95% bearing under a 4' x 4' base plate.
1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

a. "Euco-NS"	Euclid Chemical Co.
b. "Five Star Grout"	U.S. Grout Corp.
c. "Masterflow 713"	BASF
- B. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout must conform to ASTM C1107, "Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-shrink)." In addition, the grout manufacturer must furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency must achieve 95% bearing under a 18" x 36" base plate.
1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

a. "Euco Hi-Flow Grout"	Euclid Chemical Co.
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- b. "Masterflow 928" BASF
- c. "Five Star Fluid Grout 100" Five Star

2.6 RELATED MATERIALS

- A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 1241, Size 57, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 1241, Size 10, with 100 percent passing a 3/8 inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.
- C. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.
- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Waterproof paper
 - b. Polyethylene film
 - c. Polyethylene-coated burlap
- F. Curing Compounds: The compound must conform to ASTM C 309. Limit VOC content to 130 g/L. Use water-based curing compound. For surfaces receiving both a curing compound and additional flooring, verify that the curing compound and additional flooring are compatible.
 - 1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

a. SealTight 1100	W.R. Meadows
b. Kurez W VOX	Euclid Chemical Co.
c. Luster Seal WB STD	Euclid Chemical Co.
d. VOCOMP-25	W.R. Meadows
- G. Curing & Sealing Compounds: Only specify for slabs that will remain exposed, i.e. will not receive additional flooring. The compound must conform to ASTM C1315. Limit VOC content to 130 g/L. Use water-based curing compound.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. Luster Seal WB STD	Euclid Chemical Co.
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- b. VOCOMP-25 W.R. Meadows
- c. Cure & Seal Dayton Superior

H. Sealers/Hardeners: For use on concrete surfaces that will remain exposed. Slabs that will receive additional flooring do not require sealing or hardening. Sealers and hardeners must conform to ASTM D1546, not yellow under ultra violet light after 500 hours of test in accordance with and have a maximum moisture loss of 0.039 grams per sq. cm. when applied at a coverage rate of 250 sq. ft. per gallon. Limit VOC content to 130 g/L. Use water- or vegetable-based product.

1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

- a. Kure-N-Harden BASF
- b. Consolideck Prosoco
- c. Liqui-hard W.R. Meadows

I. For concrete floors subjected to heavy vehicular traffic use a Liquid Sealer/Densifier: The product must be a high performance, deeply penetrating concrete densifier conforming to ASTM C836; odorless, colorless, VOC - compliant, non-yellowing silicate based solution designed to harden, dustproof and protect and to resist black rubber tire marks on concrete surfaces. The compound must contain a minimum of 20% solids content of which 50% is silicate

J. Evaporation Retardant:

1. Products Subject to compliance with requirements, provide one of the following or approved equal:

- a. "Eucobar" Euclid Chemical Co.
- b. "Confilm" BASF
- c. "Evapre" W.R. Meadows

K. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F 710, coordination with flooring manufacturer is required to ensure concrete coatings will not obstruct the bond between the concrete and the adhesive. Ensure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive. Reactivity releases VOCs and /or other toxic fumes.

L. Crack Sealer: Elastomeric liquid crack sealer resistant to water, gasoline, oil and salts.

1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

- a. "Plasti-seal" Euclid Chemical Co.
- b. "Sikaflex" Sika
- c. "Deck-O-Seal One Step" W.R. Meadows

M. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.



1. Products: Subject to compliance with requirements, provide the following, or approved equal:
 - a. "Flo-Top 90 or Super Flo-Top" Euclid Chemical Co.
 - b. "Ardex" Ardex Co.
 - c. "Underlayment 110" Master Builders

- N. Bonding Admixture: The compound must be a latex, non-rewettable type.
 1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - a. "Flex-Con" Euclid Chemical Co.
 - b. "Daraweld C" W.R. Grace
 - c. "SBR Latex" Euclid Chemical Co.

- O. High Strength Polymer Mortar: For form and pouring or large horizontal restoration, provide the flowable on-part, high strength mortar.
 1. Products: subject to compliance with requirements, provide the following, or approved equal:
 - a. "Eucocrete" The Euclid Chemical Co.
 - b. "Euco Speed MP" (Cold Weather) The Euclid Chemical Co.
 - c. "Emaco R" Master Builders.

- P. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

- Q. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Type IV for bonding hardened concrete to hardened concrete, and Type V for bonding freshly mixed concrete to hardened concrete.

- R. Reglets: Fabricate reglets of not less than 0.022 inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

- S. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

- T. Vapor Barrier: Provide vapor barrier which conforms to ASTM E 1745, Class A or B. The membrane must have a water-vapor permeance rate no greater than 0.012 perms when tested in accordance with ASTM E 154, Section 7. The vapor barrier must be placed over prepared base material where indicated below slabs on grade. Vapor barrier must be no less than 10 mil thick in accordance with ACI 302.1R. Preferred vapor barriers will be manufactured from post-consumer recycled polymers.



1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

- | | | |
|----|--|----------------------|
| a. | “Stego Wrap (15 mil) Vapor Barrier” | Stego Industries LLC |
| b. | “Griffolyn Vaporguard” | Reef Industries |
| c. | “Premoulded Membrane with Plastmatic Core” | W.R. Meadows. |

- U. Expansion Joint Filler: ASTM D 1751.

1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

- | | | |
|----|--|------------------|
| a. | “Homex 300” | Homasote Company |
| b. | “Standard Cork Expansion Joint Filler” | A.P.S. Cork |
| c. | “Fibre Expansion Joint” | W.R. Meadows |

- V. Water: Potable.

2.7 PROPORTIONING AND DESIGN OF MIXES

- A. Preparation of Design Mixes

1. All mix designs must be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and prepared by a licensed testing laboratory approved by the City of New York, but paid for by the contractor. Submit mix designs on each class of concrete for review.
2. If previously used mixes are submitted, all materials must be from the same sources and with the same brand names as the previously utilized mix.
3. If trial batches are used, the mix design must be prepared by an independent testing laboratory and must achieve an average compressive strength 1200 psi higher than the specified strength. This over-design must be increased to 1400 psi when concrete strengths of 5000 or more are used.
4. The proposed mix designs must be accompanied by complete standard deviation analysis or trial mixture test data.

- B. Submit each proposed mix to the Commissioner for review at least 5 days prior to the pre-concrete conference. Do not begin concrete production until Commissioner has reviewed and approved mixes.

1. Submit Test reports for any pozzolans or slags indicating compliance with ASTM C 618 or ASTM C 989, respectively.
2. Provide cut sheets clearly indicating the percentages of pozzolans or slags used in the mix design as replacement for Portland cement. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the percentage.
3. Test reports for recycled aggregate indicating compliance with ASTM C 33. Provide cut sheets clearly indicating the percentage of aggregates used that are recycled. Or, if cut



- sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
4. Provide cut sheets clearly indicating the percentage of sub-base and filler aggregate materials that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
- C. Design mixes to provide concrete with strength as indicated on drawings and schedules.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to The City of New York and as accepted by Commissioner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Commissioner before using in work.
- E. Admixtures:
1. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in all concrete as required for placement and workability.
 2. Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
 3. Use high-range water-reducing admixture in pumped concrete, architectural concrete, parking structure slabs, fiber concrete, concrete required to be watertight, concrete with ultimate strength of 5,000 psi or more, and concrete with water/cement ratios below 0.50.
 4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:
 - a. Concrete structures and slabs exposed to freezing and thawing or deicer chemicals.
 - 1) 4.5 percent (moderate exposure); 5.5 percent (severe exposure) 1-1/2" max. aggregate 4.5 percent (moderate exposure); 6.0 percent (severe exposure) 1" max. aggregate.
 - 2) 5.0 percent (moderate exposure); 6.0 percent (severe exposure) 3/4" max. aggregate.
 - 3) 5.5 percent (moderate exposure); 7.0 percent (severe exposure) 1/2" max. aggregate.
 - b. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.
 - c. Interior concrete subjected to vehicular traffic: 3 percent maximum.
 5. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:



1. Concrete for precast slabs, precast beams, structural topping slab, caisson caps, caissons, poured in place slabs and grade beams, columns and walls, over water, on ground or exposed to weather: W/C 0.40.
2. Concrete on metal deck:
 - a. With specified minimum compressive strength not greater than 5,000 psi: 0.40.
 - b. With specified minimum compressive strength not greater than 7,000 psi: 0.35.
3. “Quick Dry” Concrete: 0.40.
4. Subjected to freezing and thawing; W/C 0.50.
5. Subjected to deicers/watertight: W/C 0.45.
6. Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40.

G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramp slabs and sloping surfaces: Not more than 3".
2. Reinforced foundation systems, including mud slabs below hydrostatic slabs: Not less than 1" and not more than 3".
3. Concrete containing HRWR admixture (superplasticizer): Not more than 9" unless otherwise approved by the Commissioner. The concrete must arrive at the job site at a slump of 2" to 3" (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase the slump to the approved level.
4. Other Concrete: Not less than 1" or more than 4".

H. Chloride Ion Level: Chloride ion content of aggregate must be tested by the laboratory making the trial mixes. The total chloride ion content of the mix including all constituents must not exceed the limitations set forth in Table 4.4.1 of ACI 318 for concrete subjected to deicers or exposed to chloride in service (0.15% chloride ions by weight of cement).

2.8 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce maximum mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce maximum mixing and delivery time to 60 minutes.
- D. No water may be added after mixing to concrete containing HRWR (Superplasticizer). If loss of slump occurs, the concrete treated with HRWR may be redosed as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Commissioner and the manufacturer.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.3 INSPECTION

- A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by other trades.

3.4 CONCRETE

- A. Concrete must develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31-06 and C 39-12a with the maximum slump in accordance with the approved mix design.
- B. Concrete must be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the 2008 NYC Building Code.
- C. Fly Ash Concrete & Slag Concrete: Concrete mixes containing high volumes of fly ash or Slag have slower set times and may take up to 56 days to reach full strength. The Commissioner, agency responsible for concrete mix design, the Commissioner and the concrete subcontractor must coordinate to ensure that the form stripping schedule is consistent with the ability of the structure to support itself and all imposed construction loads.

3.5 FORMS

- A. Design formwork to maximize its reusability, reduce resources devoted to formwork construction and minimize waste generated. Where appropriate choose alternative formwork systems (refer to sections listed above in Part 2).
- B. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shapes, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347. Provide Class A tolerances for concrete exposed to view. Provide Class C tolerances for other concrete surfaces.
- C. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.

- D. Construct forms to size shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back- up at joints to prevent leakage of cement paste.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, recesses, and the like, to prevent swelling and for easy removal.
- F. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.6 VAPOR BARRIER INSTALLATION

- A. Examine the condition of porous fill and remedy any unsatisfactory portions prior to installing vapor barriers.
- B. Sub-base material to be per above sections.
- C. Following leveling and tamping of sub-base for slabs on grade, place vapor barrier sheeting with longest dimension parallel with direction of pour.
- D. Lap joints 6" and seal with appropriate tape.
- E. After placement of moisture barrier, cover with granular material and compact to depth as shown on drawings.
- F. Avoid cutting or puncturing vapor barrier during reinforcement placement and concreting operations.

3.7 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Micro-Fibers: All concrete where indicated on the drawings must contain the specified micro-fibers. Length must be per the manufacturer's specification. The dosage rate must be 1.0 – 1.6 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to the Commissioner for review prior to concrete placement.
- F. Macro-Fibers: All concrete where indicated on the drawings must contain the specified macro-fibers. Length must be per the manufacturer's specification. The dosage rate must be 3.0 – 5.0 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to the Commissioner for review prior to concrete placement.
- G. Epoxy-coated reinforcing bars supported from formwork must rest on coated wire bar supports. Reinforcing bars used as support bars must be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars where specified by the Commissioner, must be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars must be made of corrosion-resistant material.
- H. Epoxy-coated reinforcing bars must be fastened with nylon- , epoxy- , or plastic-coated tie wire, or other acceptable materials.
- I. Restoration of damaged epoxy-coating: When required, damaged epoxy-coating must be restored with patching material conforming to ASTM A775. Restoration must be done in accordance with the patching material manufacturer's recommendations.
- J. Unless permitted by the Commissioner, epoxy-coated reinforcing bars must not be cut in the field. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars must be coated with the same material used for restoration of coating damage.

3.8 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to the Commissioner.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions, using manufacturer's specified welding irons.
- E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in the section for "Related Materials"
- F. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing must be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw must be used immediately after final finishing and to a depth of 1-1/4". A conventional saw must be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.
 - 1. Joint sealant material is specified in the section for "Related Materials".

3.9 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
- C. Embedded Plates at Foundation Walls: Install plate at top of forms so that exterior face of steel plate is level and plumb. Use construction documents for locations, sizes and elevations.

3.10 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, restore and patch as required to return forms to acceptable surface condition.
- B. If form-release compound is required, coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.11 CONCRETE PLACEMENT

- A. Ready-mix concrete must comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment must comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.
- B. Cold weather mixing procedures must be submitted to the Commissioner for approval.
- C. Notify the Commissioner and the City of New York’s Inspector at least 36 hours (1 1/2 regular working days) before each pour so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.
- D. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- E. General: Comply with ACI 304 “Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete,” and as herein specified.
 - 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Use internal vibrators penetrating both the top and preceding layers.
- G. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- H. Use and type of vibrators must conform to ACI 309 “Recommended Practice for Consolidation of Concrete.” Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

- I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Slabs: Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedge, bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. See also "MONOLITHIC SLAB FINISHES" below.
- L. Maintain reinforcing in proper position during concrete placement operations.
- M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.
 - 4. Care must be taken to store water-based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- N. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 - 3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

3.12 FINISH OF FORMED SURFACES

- A. Concrete mixes containing pozzolans or slags do not set at the same rate or with the same bleed water characteristic as plain Portland cement. Therefore attention must be directed to the proper procedures. Refer to ACI 232.2R and ACI 301.
- B. Rough Form Finish: For formed concrete surface not exposed-to- view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas restored and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

- C. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Correction and patch defective areas with fins or other projections completely removed and smoothed. Follow all requirements in ACI 301, Chapter 10 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

3.13 FLOOR FLATNESS/LEVELNESS TOLERANCES

- A. FF defines the maximum floor curvature allowed over 24 in. Computed on the basis of successive 12 in. (300 mm) elevation differentials, FF is commonly referred to as the "Flatness F-Number".
- B. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. (3.05 m) distance commonly referred to as the "Levelness F-Number".
- C. All floors must be measured within 72 hours of being poured and in accordance with ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).
- D. All slabs must achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Commissioner) must be 2/3 of the specified tolerances.
- E. All elevated slabs must achieve the specified FL tolerance before the removal of the forms.
- F. All slabs on metal deck must achieve the specified FF.

3.14 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to slabs at crawl spaces, unless otherwise noted. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface must achieve an FF 20 - FL 17 tolerance.
- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system, unless otherwise noted. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance and with a surface leveled to an FF 25/ FL 20 tolerance (FL17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.

- C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated, apply single trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction
- D. Sealers, Hardeners and Liquid Densifiers: Apply a coat of the specified compound to all exposed interior concrete floors where indicated on the drawings. This surface must be continuously moist cured by a method satisfactory to the Commissioner. Apply and mechanically scrub compound into the floor in strict accordance with the manufacturer's printed instructions.

3.15 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
 - 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
 - 3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 must be followed using wind breaks and sun shades when recommended. Evaporation retardant must be as specified in Section 2.04.
 - 4. Care must be taken to store water based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- B. Curing Methods: Perform curing of concrete by moisture curing, moisture-retaining cover curing, curing and sealing compound, and by combinations thereof, as herein specified.
 - 1. Provide moisture curing by following methods.
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 - 2. Provide moisture-retaining cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately correct any holes or tears during curing period using cover material and waterproof tape.



3. Provide curing and sealing compound to exposed interior slabs not receiving additional flooring. A clear curing and sealing compound must be used on exterior slabs, sidewalks and curbs not receiving a penetrating sealer.
 4. Use the specified curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply compound in accordance with manufacturer's direction.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of the specified curing compound or a continuous moist curing method approved by the Commissioner.
- E. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F710, coordination with flooring manufacturer is required to ensure concrete coatings will not obstruct the bond between the concrete and the adhesive. In addition, ensure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive.
- F. Sealer and Dustproofers: Apply a second coat of the specified curing and sealing compound to exposed interior slabs not subjected to vehicular traffic, noted on the drawings. These slabs must have received an initial coat of the curing and sealing compound.
- 3.16 SHORES AND SUPPORTS
- A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.
 - B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.
 - C. Extend shoring generally at least 4 floors under floor or roof being placed for structures over 5 stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this levels in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure. Contractor must provide the services of a registered Professional to determine timing of removal.
 - D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

- E. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.17 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 12 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.18 RE-USE OF FORMS

- A. Clean and restore surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Commissioner.

3.19 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Grout base plates and foundations as indicated using specified free-flowing non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

- E. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout must be used for all base plates larger than 10 square feet.
- F. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screeds, tamp, and finish concrete surfaces as scheduled.
- G. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.20 CONCRETE SURFACE CORRECTION

- A. Prior to all corrections, an as-built condition sketch and method of correction must be submitted to the Commissioner for review and approval.
- B. Patching Defective Areas: Restore and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Commissioner.
- C. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with a bonding grout containing the specified bonding admixture. Place patching mortar after while bonding grout is still tacky.
- D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- E. Restoration of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be corrected to satisfaction of the Commissioner. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discoloration's that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.
- F. Restore concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be corrected, remove and replace concrete.
- G. Restoration of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for tureens of slope, in addition to smoothness, using a template having required slope.
- H. Restore finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

- I. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days, except at hydrostatic slabs.
 - J. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish restored areas to blend into adjacent concrete. The specified underlayment compound or topping may be used when acceptable to Commissioner.
 - K. Restore defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
 - L. Restore isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
 - M. Structural Correction: All structural correction must be made with prior approval of the Commissioner as to method and procedure, using the specified polymer mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified must be used. In addition, all cracks must be filled with the specified crack sealer or other method as approved by the Commissioner. All garage slabs must be restored prior to the slab being treated with the specified penetrating anti-spalling sealer.
 - N. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material. Underlayment application must achieve the tolerances specified in "MONOLITHIC SLAB FINISHES" above.
 - O. Specified Polymer Horizontal Mortar: All exposed floors must be leveled, where required, with the specified self-leveling topping.
 - P. Corrective Methods not specified above may be used, subject to acceptance of Commissioner.
- 3.21 FOUNDATION WALLS
- A. The contractor must form and leave openings in walls as shown on drawings and approved shop drawings for work of other trades. These openings must be temporarily closed and when so directed, the contractor must point up in solid and neat manner with waterproofed cement.

3.22 WORK IN CONNECTION WITH OTHER TRADES

- A. Sleeves, pockets, openings, etc., must be set in the concrete walls and arches as required for the mechanical trades as shown on approved shop drawings; these must be encased or built into the concrete work and must be properly placed and secured in position in the forms before concrete is placed.
- B. Provide all chases, pipe slots, etc., required for the mechanical trades (see mechanical drawings), constructed as shown on the approved shop drawings.
- C. Leave temporary access panels where required to install mechanical equipment as required by trade affected. Panels must be formed with construction joints as specified. Details for such panels must be submitted to Commissioner for approval.
- D. Coordinate all penetrations, cutting, and patching with waterproofing trade.

3.23 CUTTING AND PATCHING

- A. Contractor for concrete work must be responsible for all cutting, removing and patching work where concrete surfaces are not installed within the limits shown on the drawings or specified herein. All such work must meet with the approval of the Commissioner.
- B. Where cutting and patching is required to accommodate the work of other subcontractors, such cutting must be done at the expense of said subcontractors but must be performed by the contractor for concrete work.
- C. The location and extent of cutting in completed concrete work and the patching thereof must meet with the approval of the Commissioner.

3.24 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The City of New York will employ a testing laboratory to perform tests and to submit test reports for Special Inspections.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Commissioner.
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 2. Slump: ASTM C 143; one test at point of discharge for each truck; additional tests when concrete consistency seems to have changed.
 - 3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each truck of air-entrained concrete.
 - 4. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.
 - 5. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 6. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 25 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each



concrete class placed in any one day; one specimens tested at 7 days, three specimens tested at 28 days, and one specimens retained in reserve for later testing if required.

- a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
7. Water Cement Ratio Test: Check water content of concrete in accordance with ‘Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying, AASHTO DESIGNATION: TP 23, SHRP DESIGNATION: 2027’ for testing procedure.
8. Test results will be reported in writing to Commissioner, and Contractor within 24 hours after tests. Reports of compressive strength tests must contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- a. Non Compliance: All test reports indicating non-compliance must be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
 - b. Nondestructive Testing: Windsor probes, sonoscope, or other non-destructive device may be permitted but must not be used as the sole basis for acceptance or rejection.
9. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Commissioner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor must pay for such tests when unacceptable concrete is verified.

3.25 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the DDC General Conditions Section 017419 Construction Waste Management and Disposal and to the maximum extent feasible.
- B. Collect cut off steel and discarded reinforcement steel and place in area for recycling.
- C. Place materials defined as hazardous or toxic waste in designated containers.

- D. Use trigger operated spray nozzles for water hoses and closed loop system to reduce water consumption.
- E. Reusable forms should be cleaned immediately after removal and non-reusable forms recycled to the maximum extent economically feasible.
- F. Incorporate crushed concrete or masonry materials in sub-base to the maximum extent feasible in accordance with sub-base specifications.
- G. Before concrete pours, designate location or uses for excess concrete. Options include:
 - 1. Additional paving
 - 2. Post footing anchorage
 - 3. Landscaping -- site concrete features
 - 4. Flowable fill
- H. To avoid contamination of the local landscape, before concrete pours, designate a location for cleaning out concrete trucks where run-off can be contained, reused or incorporated. Options include:
 - 1. Company owned site for that purpose
 - 2. On-site area to be paved later in project

END OF SECTION 03 30 00

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SECTION 03 33 00

ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes architectural cast-in-place concrete.
- B. Related Sections
 - 1. Section 03 30 00 "Cast-in-Place Concrete"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Samples - Submit
 - 1. Cement; 3 to 6 oz. sample of cement submitted prior to design mixes and submitted for each delivery of each cement type to the batch plant during construction. Label sample as to date, truck number, mill, lot number and bin number to which delivered.
 - 2. Fine aggregate; each type, 1 lb.
 - 3. Coarse aggregate; each type, 1 lb.
 - 4. Form contact materials; each type, 12" square with flange.
 - 5. Form gaskets; each type, 12" long.
 - 6. Forms for reveals and rustication; each type, 12" long.
 - 7. Reinforcement supports, chairs, tie wire; each type.
 - 8. Form ties; each type.
 - 9. 12' x 12' x 2-1/2" thick samples with finish and treatment required for each type of cast-in-place concrete work using a mix of the required ingredients, strength and color matching the designated color sample. Concrete samples are to be cast vertical against the same form material to be used in the construction. Resubmit samples until approved by the Commissioner. Include the following finishes:



- a. Off the form.
- b. Light blast (with "black beauty").
- c. Heavy blast (with "black beauty").
- d. Acid etched.
- e. Water washed.

10. Full size mock-up panels.

C. Shop Drawings: Prepare shop drawings for approval, including plans, elevations, sections, details and schedules as required to fully illustrate the work, including the Mock-up, and to meet project conditions. Include the following:

1. Formwork

- a. Submit detailed drawings showing the location of each panel including shop fabricated joints, field splice joints, tie locations, embedment locations, and clean-out openings. Specifically show details of bulkheads, reveals, recesses and corner assemblies and the means to be used to seal all joints and to maintain alignment.
- b. Shop drawings must have the stamp of a Professional Engineer licensed in the State of New York.

2. Reinforcing Steel: Comply with Section 03 30 00 "Cast-in-Place Concrete."

- a. Indicate cover, placing passages, accessories and any special detailing.

3. Placing: Submit deposit sequence within each placement, including equipment and projected time between placements.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. In addition to requirements shown or specified herein and in Section 03 30 00 "Cast-in-Place Concrete," comply with the recommendations of Chapter 11, Formwork Architectural Concrete, and Special Publication No. 4, Formwork for Concrete and ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete," as published by ACI.

1.5 MOCK-UP

A. Do not proceed with construction of the mock-up until all other samples are approved by the Commissioner.

B. Construct mock-up of a separate 4' high x 4' wide x 1'-6" thick panel on the job site. It is the intent of this specification that the mock-ups serve as the ultimate basis for final in-place work. As such, all shop drawings, details, techniques, materials, formwork, and crews and foremen used to achieve the final approved mock-ups must also be utilized for further in-place work.



- C. Coordinate with other trades performing work on the mock-up.
- D. Prior to placing architectural concrete erect the mock-up at the job site, where directed, consisting of the elements indicated and conforming with the building details. Provide footings and bracing as required or needed to ensure continuous stability of the mock-up.
- E. Install, patch, and finish concrete as specified for permanent work. Ensure that all agents and admixtures used in forming and pouring concrete can be cleaned from the work without staining, spotting, etc. Mock-up, when approved by the Commissioner, will serve as the approved sample for architectural concrete work as to color, texture, patching and appearance.
- F. If mock-up is not approved by Commissioner, remove and replace with others at no additional cost to the City of New York.
- G. Protect and maintain approved mock-up throughout construction period and remove only when directed by the Commissioner.

1.6 CONSTRUCTION CONFERENCE

- A. Within thirty (30) days following Notice to Proceed, schedule a meeting at a mutually agreeable time to include the Commissioner, the Concrete Supplier and the Formwork Manufacturer to discuss materials, methods of work and forming systems for architectural concrete work.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement and Aggregates: Supply cement and aggregates from one domestic raw material and manufacturing source. Do not change source or type of cement or aggregate without Commissioner's written approval.
 - 1. Portland Cement: ASTM C-150 White.
 - 2. Fine Aggregate: ASTM C-33, clean natural sand, consistent in color and gradation in screens finer than #16.
 - 3. Coarse Aggregate: ASTM C-33, clean crushed stone, free of material finer than #165 screen.
- B. Admixtures
 - 1. Air Entraining: Conforming to ASTM C-260, and compatible with other ingredients.
 - 2. High Range Water Reduction (Plant batched superplasticizer): ASTM C-404, Type F or G containing no chlorides.



- a. Basis of Design: Subject to compliance with requirements provide Masterbuilders; Rheobuild 716 or comparable product by one of the following:
 - 1). W.R. Grace
 - 2). Euclid
 - 3). Or approved equal.
3. Other Admixtures: Do not use unless submitted for review and acceptance. Admixtures must be certified in writing by the manufacturer to be in compliance with ASTM C-494.
4. Color Admixtures
 - a. Basis of Design: Subject to compliance with requirements provide L.M. Scofield Co.; Chromix or comparable product by one of the following:
 - 1). Davis Colors
 - 2). Lehigh Cement
 - 3). Or approved equal.
 - b. Color: As selected by the Commissioner.
- C. Water: Conform to ACI 301, Chapter 2, Paragraph 203.

2.2 FORMWORK MATERIALS

- A. Form Facing: Provide flat wall surfaces formed with plastic impregnated (min. 165 gr.), multi-layer (min. 14 plys/in), birch plywood, 3/4" thick.
 1. Basis of Design: Subject to compliance with requirements, provide Plywood and Door Corp.; Finn-Form (Red) or comparable product by one of the following:
 - a. Dayton
 - b. Fitzgerald
 - c. UPM Plywood
 - d. Or approved equal.
- B. Form Gaskets (for sealing form panel joints): Closed cell, foam rubber or neoprene gaskets, with pressure sensitive paperbacked adhesive on surfaces to be bonded to forms. Gaskets must be of sufficient thickness, widths, and compressibility for specific use.
- C. Gasket adhesive remover must not discolor concrete and must thoroughly remove any adhered adhesive.
- D. Reveal Formers and Reformers (see drawings for patterns): Resilient elastomeric with a wood core.
- E. Form Release Coating: Colorless, non-staining and having no deleterious effect on the concrete.



- F. Form Ties: Tapered stud She-Bolts, He-Bolts or Through-the-wall tapered ties. Ties will leave a hole of not more than 9/16" in dia. on the concrete surface, and no metal closer than 1" from the surface. Use ties with external spreading devices. Use stainless steel leave in material.
1. Subject to compliance with requirements, products that may be incorporated into the Work include the following:
 - a. Williams Form Engineering; She-Bolt
 - b. Dayton/Superior Co.; He-Bolt
 - c. Gates & Sons; Through-Taper
 - d. Or approved equal.
- G. Reinforcing: Provide as specified in Section 03 30 00 "Cast-in-Place Concrete" except as hereafter modified:
1. All spacing and support devices must be high density plastic or steel wire with plastic coated feet (dipped type). Color of the plastic must match the concrete color.
 2. Tie Wire: Provide non-corrosive plastic coated tie wire at exposed surfaces or for all work above an exposed soffit or ceiling.

2.3 MISCELLANEOUS MATERIALS

- A. Waterproofing Sealer: Sealer must be compatible with all other sealants it comes in contact with (i.e. expansion joints, sealants or window etc.).
1. Basis of Design: Subject to compliance with requirements, provide Lithofin PSI – Premium Silicone Impregnator by VIC International Corporation or comparable product by one of the following:
 - a. ProSoCo
 - b. Miracle Sealants
 - c. Or approved equal.
- B. Sealant: See Section 07 92 00 "Joint Sealants" for sealant for concrete to concrete in revealed expansion, construction and control joints.
- C. Concrete Etching Solution: Commercial concrete cleaner containing solvents, chloride acid, and stain removers.
- D. Curing Materials: Colorless curing compound conforming to ASTM C309.
- E. Any other miscellaneous materials required, but not specified herein, must conform to the requirements of Section 03 30 00 "Cast-in-Place Concrete."

2.4 MIXES

- A. General: Comply with Section 03 30 00 "Cast-in-Place Concrete" except that slump must be 4" plus or minus 1/2".



- B. All architectural concrete must have water reducing agent.
- C. Mix must be designed with low water content (max. 2"). Fluidity must be attained with addition of high range water reducing agent to a slump of 6" + 1" (including high range water reducing agent in color admixture).

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 FORMWORK

- A. Comply with Section 03 30 00 "Cast-in-Place Concrete" except as hereinafter specified.
 - 1. Formwork foreman must be experienced in architectural concrete formwork.
 - 2. Design forms to permit easy removal. Prying against the face of concrete will not be allowed.
 - 3. The forms must be completely rigid and strong enough to withstand without deflection, movement, or leakage, the full liquid head, and the high hydraulic pressures which result from rapid filling and high-frequency vibration.
 - 4. Use screw-type fastening devices to align and close joints at contact face. Yoke beams and columns where possible with threaded rods and use diagonal rods to hold horizontal wales at corners. Install rods so that the tightening action acts to close form joints.
 - 5. Form Panel Joints: Seal all joints in formwork, wherever located, to remain watertight. Seal as follows:
 - a. Caulked - Butt board ends and plywood edges sealed on contact surfaces.
 - b. Gasketed - Joints erected and stripped in field. Form to form or form to concrete.
- B. Reveal Formers and Reformers: Fabricate and fasten to avoid protruding splinters which may become embedded in the concrete. Fasten to hold alignment during placing.
- C. Construction Joints: Make joints only at revealed form joint locations shown on the architectural drawings. Determine spacing between construction joints by the following:
 - 1. Maximum Area of Wall Placement: 300 sq. ft.
 - 2. Maximum Dimension: 15 ft.
 - 3. The formwork for second placements of construction joints must be gasketed and held tight to the in-place concrete to prevent fluid loss.



- D. Plastic Surfaced Plywood: See architectural drawings for pattern of joints. Back fasten all contact material to supports. Penetrating the face is not permitted. Drill tie holes from contact face using brad point bits. Seal all tie holes and cut edges as directed by the manufacturer.
- E. Form Ties: Locate as detailed on drawings symmetrically in level horizontal rows and plumbed vertically. Ties shown may be used as dummy ties or working ties. Draw tie cones tight against the contact face. Maintain reusable portions of form ties free of rust and damage.
- F. Reuse of Forms: Forms may be reused only when properly maintained and in a satisfactory condition and approved by Commissioner. Do not reuse forms which cannot be tightly butted and made watertight. If reuse of forms is approved by Commissioner, clean forms, and restore damaged surfaces.
- G. Cleaning and Coating of Forms: Clean all form contact faces uniformly and coat with coat of specified form release coating per manufacturer's written instructions. Remove excess form coating and do not allow coating to come in contact with previously placed concrete against which fresh concrete will be placed.
- H. Water Stops: Apply strip to primed concrete surface as directed by the manufacturer. Position strip at edge of joint adjacent to earth for sub-grade installation and inboard of the exterior layer of reinforcing steel for above-grade installations.

3.3 FORMWORK TOLERANCES

- A. Hydraulic Pressure; Design Forms, studs and walers to limit deflections between supports and stiffening members to $L/400$ of the span.
- B. Finish Lines: Position formwork to maintain hardened concrete finish lines within the following permissible deviations.
 - 1. Variations from Plumb
 - a. In 10 ft. $\pm 1/8$ in.
 - 2. Cross-Sectional Dimensions
 - a. Minus 1/8 in.
 - b. Plus 1/4 in.
 - 3. Surface Tolerances
 - a. Maximum offset between butt joints of individual or ganged forms 1/32 in.
 - 4. Line of troweled edge at top of spandrel in 10 ft. $\pm 1/8$ in.



3.4 REINFORCEMENT

- A. General: Comply with Section 03 30 00 "Cast-in-Place Concrete" except as hereinafter modified:
1. Provide no less than 2 inches concrete coverage over reinforcing steel for architectural concrete surfaces, including beam bottoms. Notify the reinforcing steel fabricator that strict compliance to coverage requirements and bent bar details is extremely important.
 2. Cut tie wires as closely as possible to the bars, and bend behind the bars in such a manner that concrete placement will not force the wire ends to the exposed concrete surfaces.
 3. Provide an unobstructed passage, min. 10" long, between the layers of reinforcing steel for placement of tremmies and trunks in placing the concrete. Passage must be a maximum of 8'-0" apart, 4'-0" from each corner.

3.5 PLACING CONCRETE

- A. Coordination: Coordinate batch plant, transit, conveying and placing operations so that all concrete is in its final position within 1-1/2 hrs. (1 hr. when temperature is above 90 deg. F.) from the time the mix is charged with water. Perform this coordination so that any deposit load placed in the forms will be covered by a subsequent deposit within 15 minutes and in a continuous manner. Truck delivery, truck changing, crane positions, bucket size, tremmie numbers and location, lift heights, etc. must be planned and directed toward achieving homogeneous and consistent placements.
- B. General: Place concrete in accordance with Section 03 30 00 "Cast-in-Place Concrete" except as hereinafter modified:
1. Clean truck mixer drums thoroughly prior to batching. Load truck mixers at the volume which will ensure a uniform batch at the slump specified. In the event that mixing is not uniform, the truck may either be rejected and not used on the project, or if warranted, allowed to mix only batches which will ensure delivery of a uniform concrete of the specified slump.
 2. Handle concrete from the mixer to the place of final deposit as rapidly as practical by methods which prevent separation or loss of the ingredients.
 3. Clean transporting and handling equipment at frequent intervals and flush thoroughly with water before and after each day's run.
- C. Retempering: Do not place concrete in forms after it has taken initial set. Retempering of concrete which has partially set is prohibited.
- D. Clean Formwork: Formwork must be clean and free from papers, sawdust, dirt and debris immediately prior to and during the time concrete is placed thereon. Spaces must be thoroughly cleaned prior to closing formwork and maintained clean until concrete is placed. Provide formwork, which will be in place and closed while other



work is being carried out which could impair its cleanliness, with clean-out panels in surfaces not exposed to view, or with panels following approved joint lines; panels must be noted on shop drawings. Just prior to placing concrete thoroughly inspect the interior of formwork and clean out all debris with vacuum cleaners, magnets, air or water jets as required.

- E. Vibration: Compact concrete thoroughly by vibrating using internal vibrators only to produce a dense, homogeneous mass without voids or pockets. Place vibrators in the concrete vertically and thoroughly blend adjacent deposits and layers. After top out leveling of all exposed spandrels allow the concrete to set 10 to 20 minutes then give a final vibration, drawing the head out slowly to remove entrapped air. Immediately thereafter hard trowel surface.
- F. Perform all vibrating operations by the same skilled person responsible for vibrating acceptable concrete in the mock-ups.

3.6 CURING AND PROTECTION

- A. Hot Weather Protection: Comply with Section 03 30 00 "Cast-in-Place Concrete."
- B. Curing: Apply curing compound immediately after form removal in accordance with manufacturer's recommendations for maximum moisture retention and colorless application.
- C. Protect all horizontal and vertical corners of concrete for full length or full height of exposed corner with continuous wood corner guards. In areas where high activity warrants, protect all vulnerable surfaces.

3.7 FORMED CONCRETE FINISHES AND TREATMENTS

- A. Finish and Treatment of Formed Concrete Surfaces: Provide architectural concrete formed surfaces with "as-cast" finish, using forms specified and where indicated on drawings. Provide concrete surfaces with the following treatment as indicated below:
 - 1. Dressing, patching, texturing by etch cleaning, light and heavy blasting, and water washing, and the application of a water repellent.
- B. Final Finish Types: Apply the following finish types as required below:
 - 1. Dressing: Removal of all runs, splatters, fins, projections, and stains, in a manner which avoids scarring, staining or scratching the surface.
 - 2. Patching Exposed Concrete: It is the intent of these specifications that the concrete work will be performed in a manner that no patching of exposed concrete will be required. In the event remedial action is accepted as a means of rendering work acceptable it may consist of patching with a texture-matched technique and color matched mortar. Only areas designated by Commissioner will be patched. Patch after the application of texture treatment and before the water repellent application.
 - 3. Texturing of Concrete: Provide all exposed surfaces with the following treatment:



- a. Light abrasive blast finish to match approved samples and mock-up.
 - b. All concrete to be treated must be a minimum of twenty-one (21) days old.
 - c. Thoroughly clean work areas of waste material as soon as each segment of work is completed, and protect work which may be damaged by this operation in an accepted manner. Be responsible for fallout and for protecting persons, adjacent work and property.
 - d. Etch Cleaning
 - 1). Apply cleaner in an even manner break to break and joint to joint of surface, allow to set and flush in a consistent manner throughout project. Proceed in a manner approved by the product manufacturer.
 - 2). Treatment must produce a "matte" surface by just removing the surface of the cement skin. Treatment must not expose aggregate larger than that passing #20 screen.
 - e. Tie Holes: Tie holes requiring plugging will be plugged with concrete. Spalled or defective tie holes may be required to be patched with approved patching mortar, but only patch if required by Commissioner.
4. Corners, whether horizontal or vertical, must not be chamfered.
 5. Apply waterproofing sealer to wall surfaces in one application following manufacturer's instructions.

END OF SECTION 03 33 00



SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Concrete block interior partitions.
2. Metal joint reinforcing, anchors, and related accessories for masonry.
3. Control joints in masonry, filled with joint fillers.
4. Chases, recesses, pockets and openings in masonry as required for installation of work by others.
5. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
6. Grouting in of metal items built into masonry work.
7. Protection, pointing and cleaning of masonry.

B. Related Sections

1. Section 07 84 13 "Penetration Firestopping"
2. Section 07 92 00 "Joint Sealants"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit Shop Drawings for the following:
1. Anchoring details.
 2. Control and expansion joint locations and details.



- C. Submit Samples for the following:
 - 1. Joint reinforcing, each type, width and proposed location (labeled).
 - 2. Anchors, each type, width and proposed location (labeled).
 - 3. Joint filler, each type.
 - 4. Mortar color, 12" long cured sample.
- D. Submit technical and installation information for the following:
 - 1. Mortar materials, each material and mortar type.
 - 2. Certification of mortar mix.
 - 3. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
 - 4. Block manufacturer must submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sample of concrete block may be tested by an Independent Testing Laboratory retained by the City of New York according to the requirements of ASTM C 140.
- E. Cleaning Procedures: Submit proposed procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect gaskets, sealants, etc.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Work of this Section must conform to the requirements of the following:
 - 1. 2011 ACI 530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures.
 - 2. 2011 ACI 530-1/ASCE 6/TMS 602 Specifications for Masonry Structures.

1.5 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.



- C. Aggregate: Store with provisions for good drainage.
- D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

1.6 CODE REQUIREMENTS

- A. Work of this Section must conform to all applicable requirements of the 2008 New York City Building Code.
 - 1. Concrete block must comply with Chapter 21 of the 2008 New York City Building Code.
 - 2. Concrete block must be type approved by the Board of Standards and Appeals.
 - a. Concrete block used for fireproofing must conform to 2008 New York City Building Code requirements and provide ratings required by the Contract Documents.
- B. Fire rated masonry partitions must have MEA or BSA number.
- C. Conform to New York City Local Law 17-95 for seismic requirements.

1.7 JOB CONDITIONS

- A. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed. Immediately remove grout, mortar, and soil that come in contact with such masonry.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Standard Concrete Block
 - 1. Portland cement, ASTM C 150, Type 1, low alkali (less than 0.6%), single source for entire project.
 - 2. Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process.
 - a. Product: Subject to compliance with requirements, provide one of the following:
 - 1). Northeast Solite Corp.; Solite
 - 2). Norlite LLC; Norlite
 - 3). Buildex Inc.; Haydite
 - 4). Or approved equal.



- b. Block scheduled to receive painted finish must contain normal weight aggregate meeting ASTM C 33 in addition to lightweight aggregate in order to receive a smooth, uniform finish.
3. Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90, Type 1.
 - a. Block for fire-rated walls must be 75% solid units.
4. The producer of the concrete masonry units must furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL 618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and 6" units must conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.
5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
6. Finish: For exposed or painted block surfaces, in addition to ASTM requirements, block must have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces must be free from deleterious materials that would stain plaster or corrode metal.
7. Curing: All concrete block must be steam cured, and air dried for not less than thirty (30) days before delivery.
8. Density of concrete block must not exceed one hundred and five (105) lbs. per cubic foot.
9. Shrinkage: Shrinkage of concrete blocks must not exceed 0.065% when tested in accordance with ASTM C 426-16, Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.
10. Water Content
 - a. At the time of delivery to the job site, concrete masonry units must have a value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.
 - b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.



B. Joint Reinforcing for Masonry Walls

1. For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Provide mill galvanized reinforcing conforming to ASTM A 641, Class B-1, applied after fabrication.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1). Hohmann & Barnard
 - 2). Heckmann Building Products
 - 3). Wire-Bond
 - 4). Or approved equal
2. Wire used in assemblies noted above must be cold drawn steel wire conforming to ASTM A 82.

C. Anchors

1. Wire Mesh: Galvanized sixteen (16) gauge steel wire, 1/4" square mesh, width 1/2" less than wall thickness, by length to suit condition.
2. For anchoring masonry to structural steel, provide hot-dip galvanized steel anchors. Galvanizing must conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1). Hohmann & Barnard
 - 2). Heckmann Building Products
 - 3). Wire-Bond
 - 4). Or approved equal
3. For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel partition top anchors.
 - a. Product: Subject to compliance with requirements, provide one of the following:
 - 1). Heckmann Building Products; No. 419 and No. 421
 - 2). Hohmann & Barnard; No. PTA 420
 - 3). Wire-Bond; PTA #4301
 - 4). Or approved equal.
4. For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.



- D. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.
- E. Control Joint Fillers
 - 1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which provides a force fit in the grooves of the sash block, and has 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
 - a. Provide the following sizes:
 - 1). 2-5/8" wide control joint fillers for 4" block walls.
 - 2). 4-5/8" wide for 6" block walls.
 - 3). 6-5/8" wide for 8" block walls.
 - b. Provide backer rod and sealant joint over joint filler as per drawings and Section 07 92 00 "Joints Sealants."
 - 2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Recess joint filler and install backer rod and sealant as per drawings and Section 07 92 00 "Joints Sealants."
- F. Neoprene Joint Filler: Provide closed cell neoprene, Type NN-1, conforming to ASTM D 1056, Grade 1, high performance
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Williams Products Inc.
 - b. D. S. Brown
 - c. Norton
 - d. Or approved equal.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, standard color, one source.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: Clean, washed, buff colored sand, graded per ASTM C 144.
- D. Water: Clean, fresh and suitable for drinking.

2.3 MORTAR MIX

- A. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N; for load bearing conditions, provide mortar conforming to ASTM C 270, Type M.



- B. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.
- C. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Provide grout with a minimum compressive strength of 3000 psi when tested in accordance with ASTM C 1019.
- D. Mixing
 - 1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
 - 2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes, not to exceed five (5) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
 - 3. Acceleration or other admixtures not permitted.
 - 4. Provide mortar with a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.
- E. Admixtures
 - 1. Do not use air-entraining admixtures or cementitious materials containing air-entraining admixtures in the mortar.
 - 2. Do not use antifreeze compounds or other substances in the mortar to lower the freezing point.
 - 3. Do not use calcium chloride or admixtures containing calcium chloride in mortar.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. General

- 1. Do not wet concrete block units.



2. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
3. Build chases and recesses as shown or required for the work of other trades.
4. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
5. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
6. Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.
7. Pattern Bond: Lay exposed masonry patterns as noted on drawings. If not shown, provide running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
8. Where possible, build masonry walls and partitions after all overhead ducts, pipes and conduits are in place and tested. Neatly build masonry around the items above. Walls and partitions must be plumb, true to line and free from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, make all such surfaces, including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, suitable for paint application. Cut openings in walls and partitions in place only with the approval of the Commissioner.
9. Execute masonry work that is finish surface precise and clean. Cut block surfaces of block must not be visible. On all architectural surfaces, grout must be flush or concave (to be determined with help of mock-up), and even and consistent throughout.

B. Mortar Bedding and Jointing

1. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells.
2. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
3. Exposed joints must be flush with the surface of concrete masonry units. Concealed joints must be struck flush.



4. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

C. Built-In Work

1. As the work progresses, build in items specified under this and other Sections of these specifications. Fill in solidly with masonry around built-in items.
2. Grout in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.
3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout.
4. Seal sleeves, pipes, ducts and all other items which pass through masonry walls with interior grade sealant meeting requirements of Section 07 92 00 "Joints Sealants," so as to be air tight and prevent air leakage. Refer to Section 07 84 13 "Penetration Firestopping" for packing of voids in rated masonry walls.
5. Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell, including stone anchors and window or curtain wall anchors.
6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
7. Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.
9. Fill all voids solid with grout in masonry indicated as being reinforced. Consolidate grout in place by vibration or other methods which ensure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour must not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour must not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour must be stopped 1-1/2" below the top of a masonry unit. Accurately place vertical bar reinforcing, hold in position before grouting starts and while being grouted. All such reinforcing must have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 1/2 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.



D. Cutting and Patching

1. Accurately cut to size with motorized carborundum or diamond saw all exposed masonry which requires cutting or fitting, producing cut edges.
2. Neatly drill holes made in exposed masonry units to proper size for attachment of handrail brackets and similar items.
3. All masonry which requires patching in exposed work, if approved by Commissioner, must be patched neatly with mortar to match appearance of masonry as closely as possible and to the Commissioner's satisfaction. Rake back joints and use pointing mortar to match as required.

E. Solid Wall Construction

1. Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging.
2. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.

F. Interior Block Partitions

1. Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler as specified herein. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 07 84 13 "Penetration Firestopping." Fasten to structure at top of partition using steel angles as specified herein.
2. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.
3. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
4. Corners
 - a. Provide interlocking masonry unit bond in each course at corners.
 - b. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.
5. Intersecting and Abutting Walls
 - a. Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.



- b. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.
- G. Anchoring Masonry to Structure: Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
- H. Control Joints
- 1. Provide vertical control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
 - 2. CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 20'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
 - a. At structural column or joint between bay.
 - b. Above control joints in the supporting structure.
 - c. Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 7'-0" wide and at both sides for openings over 6'-0" wide.
 - d. At reduction of wall thickness.
 - e. Where masonry abuts supporting structure.
 - f. If additional joints are required, indicate same on approved shop drawings.
- I. Lintels: For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the following table, filled with grout.

Number and Size of Reinforcing Bars Required at Concrete Block Lintels		
Maximum Clearance Span	Wall Width	Rebar No. - Size
2'-0" to 6'-0"	6"	2 - #3
6'-0" to 8'-0"		2 - #4
2'-0" to 6'-0"	8"	2 - #3
6'-0" to 8'-0"		2 - #4
2'-0" to 6'-0"	12"	3 - #3
6'-0" to 8'-0"		3 - #4

3.3 CLEANING, PROTECTION, ADJUSTMENT

A. Protection

- 1. Take adequate precautions for the protection of all surfaces against mortar spatter. Immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
- 2. Wipe excess mortar off masonry surfaces as work progresses.



3. Place wood coverings over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
 4. Perform protective measures in a manner satisfactory to the Commissioner.
 5. Replace damaged masonry units to satisfaction of the Commissioner.
- B. **Cleaning of Masonry:** Upon completion, thoroughly clean all exposed masonry following recommendations of the BIA Technical Note No. 20. Before applying any cleaning agent to the entire wall, apply it to a sample wall area of approximately 4' x 4' in a location approved by the Commissioner. No further cleaning work may proceed until the sample area has been approved by the Commissioner, after which time the same cleaning materials and method may be used on the remaining wall area. If stiff brushes and water do not suffice, thoroughly saturate the surface with clear water and then scrub with a solution of an approved detergent masonry cleaner, equal to "Vana Trol" made by ProSoCo Inc. or equal made by Diedrich, EaCo Chem, Inc. or approved equal, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. Thoroughly protect all lintels and other corrodible parts during cleaning.
1. Unless otherwise required by cleaning agent manufacturer use only low pressure device (30 to 50 psi) for application of cleaning agent and water rinsing.
- C. **Pointing:** Point any defective joint with mortar identical with that specified for that joint.

END OF SECTION 04 20 00

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Furnish and deliver for installation by others, anchor bolts, bearing plates and loose lintels with complete instructions and templates to facilitate installation.
2. Furnish and erect all columns, bearing plates, beams, girders, bracing, hangers and all related connections (bolted and welded).
3. Openings (unreinforced and reinforced) in structural steel to accommodate mechanical and electrical work.
4. Shop painting and field touch-up painting.
5. Erection bracing and supports, including steel wedges, shims or nuts required for leveling base plates.
6. Lintels and angles attached to structural steel as shown on drawings.
7. Unless specifically excluded, furnish and install all other items for structural steel work indicated on the drawings, specified, or obviously needed to make the work of this Section complete.
8. Waste Management

B. Related Requirements:

1. DDC General Conditions “Construction Waste Management and Disposal”
2. Section 03 30 00 “Cast-In-Place Concrete”
3. Section 04 20 00 “Unit Masonry”
4. Section 05 31 00 “Steel Decking”
5. Section 05 50 00 “Metal Fabrications”
6. Section 06 20 00 “Finish Carpentry”
7. Section 07 13 00 “Foundation Waterproofing”
8. Section 07 92 00 “Joint Sealants”

C. Related Work Specified Elsewhere

1. Installation of anchor bolts furnished under this section.
2. Grout under base and bearing plates.
3. Installation of loose lintels furnished under this section.
4. Miscellaneous metal work
5. Field painting of structural steel, except as specified herein.
6. Fireproofing systems.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of all connections required by the drawings to be completed by structural steel fabricator (including comprehensive engineering analysis by a qualified Professional Engineer licensed in the State of New York) to withstand loads indicated and comply with other information and restrictions indicated, unless noted otherwise.
 - 1. Select and complete connections using schematic details indicated and AISC 360.
 - 2. Use design method indicated on structural drawings.
 - 3. Moment Connections: Fully restrained unless otherwise noted on drawings.
- B. Lateral Framing Resisting System: Type used is indicated on structural drawings.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: Product data, including manufacturer's specifications, load tables, section properties and installation instructions for each type of decking and accessories.
- C. Shop Drawings: Submit shop drawings in accordance with the specifications as follows:
 - 1. Show clearly all work, including relationship of structural steel to the adjacent work of other trades and to significant lines of finishes of other trades.
 - 2. Do not fabricate or deliver work to the site before drawings reviewed by the Commissioner have been returned.
 - 3. Before preparing steel shop drawings, submit proposed submittal schedule for review by the Commissioner.
 - 4. Before preparing steel shop drawings, submit for review a set of job standards showing all necessary joint details with full particulars of connection pieces, shop and field welds, and holes for erection bolts and permanent bolts. These must include any moment and shear connections. Appropriate marks for designating all types and sizes of joint details must be included. After approval of these job standards, the erection plans are to be submitted and must be marked to indicate unmistakably the type and size of joint to be used for every beam connection. Do not order steel in advance of approval of the job standards and the erection plans with joint marks, except at own risk
 - 5. Submit calculations for design of connections on job standards and all other connections. Calculations must be signed and sealed by a Professional Engineer licensed in the State of New York.
 - 6. Prepare remainder of steel shop drawings after approval of job standards and erection plans. Drawings submitted prior to approval of job standards will be returned without review.



7. Prepare shop drawings in conformance with the applicable procedures shown in "Detailing for Steel Construction," latest edition, published by AISC. Prepare shop drawings under the supervision of competent engineering personnel, licensed by the state in which the construction is to take place. During the preparation of shop drawings, and prior to submittal, coordinate and cross check all shop drawings, including those prepared by subcontractors, for compliance with the Contract Documents.
8. Indicate clearly the size and grade of steel for each component. Identify rolled shapes, tubes and plates by using the standard designations used in "Steel Construction Manual" Latest Edition, by AISC.
9. Indicate welds and nondestructive tests by using the symbols conforming to AWS A2.4 "Symbols for Welding and Nondestructive Testing." Where necessary for clarity, indicate welding procedure designations or other data in the tail of the welding symbol.
10. Show explicitly the type of connection used in each location, the grade, size, and number of bolts; the type, number, position, designation and orientation of each washer; and the size of each hole, whether slotted or round. Ensure that adequate wrench clearance for correct bolt tightening is provided and note special bolt tightening sequences where applicable and necessary.
11. Show all camber dimensions in the shop drawings. Where specific camber is not shown in the drawings, note on each affected shop drawing that such members are to be fabricated with the natural camber up.
12. Show holes required for securing work specified in other sections to structural steelwork, as well as all holes required for passage through structural steelwork of work of other trades. Provide field work drawings for all such holes not shown in shop or erection drawings. Addition of, or change in size or location of openings will not be permitted without prior approval.
13. Use bolted connections wherever possible; avoid field welding unless otherwise noted on drawings.
14. Make details in such a way as to avoid having steel, connections, bracing, bolts, etc., interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.
15. Detail and schedule cleaning and painting data and requirements, including specific indication of "no-paint" areas.
16. The use of the Commissioner 's electronic drawing files as a base for the erection shop drawings will be permitted at the request of the structural steel detailer. The use of the Commissioner 's electronic drawing files as a base for shop drawing details will be not be permitted. The structural steel detailer will be responsible for compatibility of the files with the hardware or software. The electronic files are not to be considered the contract documents, the the Commissioner makes no representation regarding the accuracy or completeness of the electronic files given to the structural steel detailer and their use will be at the structural steel detailer's sole risk. The structural steel detailer must remove the project title box and all references to the structural drawings including drawing numbers and structural drawing sections and details. The structural steel detailer must also remove all reference to work not included in the steel contract.
17. Show clearly the size and location of each member and the erection mark assigned to each member. Show each field connection with all data and details necessary for assembling the structure. Direct special attention to the possible need for special guying, bracing, or shoring to prevent deformation of existing or new structure due to stresses caused by erection procedures and equipment, by construction loadings, and by forces of natural phenomena.
18. Prepare, keep up-to-date, and submit a complete drawing index cross-referencing each



assigned piece mark with the drawing number in which the piece is detailed. Detail drawings submitted without an up-to-date index and the applicable erection drawing(s) showing the location of each piece will be deemed an incomplete submission and will not be accepted as subject to any agreed shop drawing review schedule.

19. Prepare anchor bolt and base plate erection drawings containing complete location and placing details, including details of all templates. Provide anchor bolt erection drawings to the concrete trade in advance of applicable concrete work and in coordination with concrete construction sequence.
20. Submit, in writing, any proposed deviations from the Contract Documents, prior to the submission of shop drawings showing the proposed deviation. Submit requests for deviations on the steelwork subcontractor's letterhead. Deviations not identified, or identified only in letters of transmittal or in shop drawings or both, without the required written request, may not be accepted, and will be sufficient cause for the Commissioner to return each shop drawing containing such deviations without further action. Acceptance of shop drawings containing deviations not detected by the Commissioner during shop drawing review does not relieve the steelwork subcontractor from responsibility to conform strictly to the Contract Documents.
21. Prior to resubmission of shop drawings with additions or corrections, circle or bubble and identify all changes. Drawings submitted without each change being clearly identified are subject to return for resubmission.
22. Prior to making shop drawings for any portion of the work involving alterations to an existing structure, make all necessary field observations, measurements and surveys of existing conditions. If probes are required to accomplish such measurements, give timely notice where probes will be required.

D. Submit certified copies of each survey conducted by a surveyor licensed by the state in which the construction is to take place and employed by the structural steel subcontractor. Survey must show elevations and locations of base plates and anchor bolts to receive structural steel, and final elevations and locations for major members. Indicate discrepancies between actual installation and Contract Documents.

E. Reports:

1. Submit certified copies of mill test reports for all steel furnished. Perform mechanical and chemical tests for all material regardless of thickness or use.
2. Submit certification of recycled steel content. Certification must clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
3. Submit mill and fabricator certification of compliance with ISO14001.
4. Submit anchor bolt checking certification as required.
5. Submit qualification certificates of all welders who will perform work on the project.
6. Submit survey of erected steelwork as required.

F. Submit verification of bio-degradable or low VOC, and low Hazardous Air Pollutants (HAPS) cleaning solutions. Provide a cut sheet for all cleaning solutions used in the surface preparation of steel components. Highlight VOC limits and chemical component limits.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



B. Except as modified by this specification, comply with the applicable provisions and recommendations of the following codes and standards:

1. New York City Building Code, 2008
2. AISC 360-05 "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
3. AISC 303-05 "Code of Standard Practice for Steel Buildings and Bridges".
4. AISC 341-05 "Seismic Provisions for Structural Steel Buildings".
5. Industrial Fasteners Institute "Handbook of Bolt and Bolted Joints" 1998.
6. RCSC 2014 "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts."
7. ASTM A 6 "General requirements for rolled steel plates, shapes, sheet piling and bars for structural use".
8. AWS D1.1 - 04, "Structural Welding Code."
9. AWS A5.18 & A5.28, Structural Welding Code for GMAW
10. SSPC PB-00802, 2000 "Painting Manual, Volume 2, Systems and Specifications."

C. Qualifications for welding work must be as follows:

1. Qualify welding procedures and welding operators in accordance with the AWS "Standard Qualification Procedure."
 - a. Include amended requirements of the 2008 New York City Building Code.
2. Submit certification that all welders to be employed in work are AWS qualified. If recertification of welders is required, retesting will be responsibility of structural steel subcontractor.
 - a. Include licensing requirements of the 2008 New York City Building Code

1.7 TESTING AND INSPECTION

A. Special Inspection as required by the NYC Building Code of all structural steelwork in the shop and field will be performed by an inspection agency retained by the City of New York. The inspection agency must work under the direction of the City of New York. Contractor must provide the inspection agency with the following:

1. Schedule of all work in both shop and field with at least ten days' written notice before commencement of either activity.
2. A complete set of approved shop and erection drawings.
3. Cutting lists, order sheets, material bills, shipping bills and mill test reports.
4. Information as to time and place of all rollings and shipment of material to shops.
5. Representative sample pieces as requested by the testing agency.
6. Full and ample means and assistance for testing all material.
7. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.

B. Each person installing connections must be assigned an identifying symbol or mark and all shop and field connections must be so identified so that the inspector can refer back to the person making the connection.

C. The following minimum criteria must be adhered to in testing of welds and bolts:



1. All welds and bolts must be examined by visual means.
 2. 25% of all welds, selected randomly, must be measured.
 3. 25% of all bolts, selected randomly, must be checked with calibrated torque wrench.
 4. In addition, all welds subject to tensile stress must be examined by the Ultrasonic Method for 100% of their length.
 5. 10% of all manual fillet welds must be tested by the magnetic particle method.
 6. 1'-0" at each end of automatic fillet welds must be tested by the magnetic particle method.
 7. 100% of groove welds must be tested by the ultrasonic method.
- D. Shop inspection will include examination of steel for straightness and alignment, fissures, mill scale, and other defects and deformities, as described in ASTM A6, examination of fabricated pieces for conforming to approved shop drawings, testing of bolts and welds, and inspection of shop painting. All shop welds must be visually inspected and spot tested using Ultrasonic Method ASTM E 114 and AWS, Chapter 6, Part C. All inspected welds must be identified by the inspector.
- E. Field inspection will include examination of erected steel for welding, proper fitting and tensioning of bolts, alignment, trueness and plumbness, touching-up of shop coat, level of billets and base plates.
- F. Inspection of welding will be such as to assure that the work is within the quality requirements specified below and elsewhere in this section of the specifications and will include:
1. Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW welding processes conform to the requirements of this section of the specifications.
 2. Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Commissioner.
 3. The testing agency must be prepared to utilize the following approved methods of testing:
 - a. Liquid penetrant inspection: ASTM E 165.
 - b. Magnetic particle: ASTM A 709.
 - c. Radiographic inspection: ASTM E 94 and E 1032.
 - d. Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C.
- G. When defects are revealed, additional inspection by whatever method is deemed necessary by the inspector, must be performed to the extent necessary to assure that the full amount of defect has been located. No further work may be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects must be corrected, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the corrected weld must be by the same method that was used to reveal the defect. A second correction of a defective area must not be made without approval of the Commissioner.
- H. Apparatus and procedure for measuring torque and tension in high strength bolts and for calibrating wrenches must be furnished and maintained by steel subcontractor, and must be approved by the inspection agency. Wrenches must be calibrated each day at the beginning of the work, each time the bolt size or length of pressure hose is changed, and at such other times as the inspection agency may direct. Periodic checks of high strength steel bolt connections will be made in the field by the inspection agency. The steel subcontractor must maintain at all times during erection a manual torque wrench, and must provide a laborer and scaffolding as



required for the testing of connections by the inspection agency, and will at own expense, furnish such facilities and provide such assistance as may be required for proper inspection.

- I. A distinguishing mark will be placed on all work that has been inspected and approved. Material or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR" marked directly on the material or work.
- J. Inspection of Shop Painting:
 - 1. Visually evaluate surface preparation by comparison with pictorial standards in accordance with SSPC-Vis 1.
 - 2. Measure dry film thickness of each coat with a magnetic film thickness gauge in accordance with SSPC-PA 2.
 - 3. Visually inspect dried film for runs, sags, dry spray, overspray and missed areas.
 - 4. Correct defective or damaged areas in accordance with painting requirements specified. Architecturally exposed structural steel must be free of runs and holidays. Make corrections to shop or field coat as directed.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. Minimize the disturbances to site and soil conditions.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration, discoloration or staining.
- D. Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Restore or replace damaged materials or structures as directed.

1.9 PROJECT CONDITIONS

- A. The structural steel subcontractor must coordinate the structural steel work with the work of other Contracts. Verify all dimensions and details of this Trade and those of other Trades that affect the work before proceeding. Any discrepancies must be immediately reported to the Commissioner.
- B. Be fully responsible for the accurate installation of the work. Any discrepancy which arises from failure to execute the work in conformity to the drawings and specifications must be properly remedied at the contractor's own expense and in a manner acceptable to the Commissioner.
- C. Locate dimensionally on setting plans all anchor bolts, inserts, bearing and base plates, etc., and prepare and deliver all required templates and fully dimensioned setting plans in time for the proper execution of the work. Anchor bolts must be set by another subcontractor. The structural steel subcontractor must check all such settings for correctness after they have been cast in place, and before proceeding with erection work.

- D. Report to the Commissioner and certify compliance with the above checking requirements in writing and indicate any inaccuracies found in the location of anchor bolts or inserts, and corrections which must be made to their installation. Any inaccuracies not included in the report and found during or after steel erection will be the responsibility of the structural steel subcontractor.
- E. Use base lines, bench marks, or other standards for survey work that have been provided or verified by others. If permanent building bench marks have been established, these will be used for field checking.
- F. Coordinate with all other trades to ensure that work of this section does not cause undue conflict. Ensure that location of erection devices such as cranes, derricks, booms or hoists, does not cause over-stresses to steel frame to work previously placed by other trades or to existing structures. When required, retain the services of a Professional Engineer licensed in the State of New York to ascertain that erection devices do not create unsafe conditions or cause overstresses.
- G. Ensure full co-ordination with other related trades and professions.

1.10 SUBSTITUTION

- A. Commissioner reserves the right to require substitute shapes of other sizes than those indicated on the drawings when it is apparent that the shapes specified cannot be furnished within the time required for the progress of construction. Make said substitutions without additional cost to the City of New York.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel shapes, including structural steel wide flange and structural tee rolled shapes, channels, angles, plates, pipe, and hollow structural sections: As noted on structural drawings.
- B. High Strength Bolts:
 - 1. Slip-critical bolts as noted on structural drawings, with hardened washers
- C. Anchor Bolts: As noted on structural drawings
- D. Filler metal for welding electrodes. As noted on structural drawings.
- E. Structural steel primer paint: rust inhibitive primer conforms to the following criteria
 - 1. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
 - 2. Demonstrate a minimum opacity as determined by ASTM D 2805
 - 3. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
 - 4. "Slip Critical" compatible rating where applicable
 - 5. The product must not contain any of the prohibited compounds as listed in Green Seal *Standard for Paintings and Coatings*, GS-11, latest edition and in Master Painters Institute (MPI) *Green Performance Standard*, GPS-1-08.



6. The product must meet the VOC limits as set forth in the MPI Green Performance Standard, GPS-1-08, with a maximum allowable VOC of 340 g/L for rust preventative coatings. Limits are expressed in THINNED state. Preference must be given to products with the least crystalline silica content.
 7. The product must meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
 - a. Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based paints (MPI #'s 76, 79 & 101)
 - b. Interior exposed steel: Use water based paint (MPI # 107)
 - c. Special Applications, highly corrosive environments: Use zinc rich paints (MPI #'s 20 & 200)
- F. Structural steel field paint for exposed members: rust inhibitive primer conforms to the following criteria
1. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
 2. Demonstrate a minimum opacity as determined by ASTM D 2805
 3. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
 4. "Slip Critical" compatible rating where applicable.
 5. The product must not contain any of the prohibited compounds as listed in Green Seal *Standard for Paintings and Coatings*, GS-11, latest edition and in the Master Painters Institute *Green Performance Standard*, GPS-1-08.
 6. The product must meet the VOC limits as set forth in the MPI Green Performance Standard, GPS-1-08, with a maximum allowable VOC of 400 g/L for rust preventative coatings. Limits are expressed in THINNED state. Preference must be given to products with the least crystalline silica content.
 7. The product must meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
 - a. Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based paints (MPI #'s 23, 79)
 - b. Interior exposed steel: Use water based paint (MPI # 107)

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 FABRICATION

- A. All shop connections must be high strength bolted unless specifically shown otherwise. Fabricate work in shop in as large assemblies as practicable. Use welded connections only where shown on drawings. If a bolted connection is not possible obtain written approval from the Commissioner for the welded connection.

- B. Camber: As indicated on drawings.
- C. Mill column ends and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of bearing plates when required by the AISC Specifications. It is not necessary to plane bottom surfaces of plates on grout beds.
- D. Drill or punch holes at right angles to the surface of the metal, not more than 1/16" larger than the connector diameter. Do not make or enlarge holes by burning. Drill material having a thickness in excess of the connector diameter and material thicker than 7/8". Holes must be clean-cut without torn or ragged edges. Remove outside burrs resulting from drilling operations.
- E. Provide holes in members to permit connection of the work of other trades. Use suitable templates for proper location of these holes. Steel requiring adjustment or accurate alignment must be provided with slotted holes or full bearing shims as shown.
- F. Provide holes, slots and openings required by other trades together with necessary reinforcing required. Use suitable templates for proper location of these openings. All such openings must be shown on the shop drawings. No change in size or location will be permitted without prior approval.
- G. Manual flame cutting must be done only with a mechanically guided torch. An unguided torch may be used provided the cut is within 1/8" of the required line.

3.3 SHOP CONNECTIONS

- A. Provide connections as shown on the drawing exactly as detailed. Where connections are not detailed, the minimum connections must comply with appropriate tables headed, "Framed Beam Connections" shown in the AISC "Manual of Steel Construction" unless otherwise noted on the drawings. Use high strength bolts unless otherwise shown.
- B. Do not use welded connections unless shown on details. Filed welding is not allowed without written instruction from the Commissioner.
- C. Proportion and detail all connections on shop drawings to resist forces shown on design drawings. If no reactions are indicated on design drawings, design connections for non-composite beams to resist the end reaction shown in the AISC tables for Uniform Load Constants for Beams. Connections for composite beams must be proportioned to resist 150% of the above mentioned tabulated load.
- D. Bolting
 - 1. Bolts must be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the thread.
 - 2. Use high-strength bolts in friction as shown. Make high-strength bolted joints without the use of erection bolts. Bolt heads and nuts must rest squarely against the metal. Where structural members have sloping surface, bolted connections must be provided with beveled washers to afford square seating or framing for bolt heads or nuts. Bring members tightly together with sufficient high-strength "fitting-up" bolts which must be retightened as all the bolts are finally tightened. Manual torque wrenches will not be accepted for final tightening. Protect bolt heads from damage during placing. Final



tightening of high-strength bolts must be by properly calibrated power torque wrenches. Bolts that have been completely tightened must be marked for identification.

E. Welding

1. The following environmentally preferable welding processes must be used as described for the related application without exception:
 - a. Submerged Arc Welding (SAW): Plate girders, fillet and butt joints in pipes, cylinders, columns and beams, and welds where ‘downhand’ or horizontal positions are possible.
 - b. Gas Metal Arc Welding (GMAW) must be used where SAW is not applicable (such as for angled connections and anything irregular or short).
 - c. Field welding must be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) must be specified
2. Do not begin structural welding until joint elements are inspected for surface preparation, fit-up, and cleanliness of surface to be welded and are then bolted or tacked in intimate contact and adjusted to dimensions shown on drawings, or both, with allowance for any weld shrinkage that is expected. No members are to be spliced without prior approval by the Commissioner.
 - a. Containment surface preparation debris must meet SSPC-Guide 6 guidelines.
3. Pre-heat and interpass temperature must be in accordance with Table 4.2 (including footnotes) of the AWS Code for Welding in Building Construction. The temperature must be measured from the side opposite to that which the pre-heat is applied, where possible.
4. All groove welds must be continuous and full penetration welds unless otherwise shown on the design drawings. Welds made without the aid of a back-up bar must have their roots chipped, ground or roughened out to sound metal from the second side, before welding is done from the second side.
5. All welds must be sound throughout. There must be no crack in any weld or weld pass. Weld may be considered sound if it contains only slight porosity or fusion defects which are well dispersed.
6. The heat, input, length of weld and sequence of weld must be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used will be subject to inspection before any welding is performed.

3.4 SHOP PAINTING AND CLEANING

A. Finishing, coating, plating

1. Shop painting and factory finishing must be preferred to field painting whenever possible. Where applicable, finishes and surface preparations based on a physical process such as abrasive blasting, grinding, buffing and polishing are preferred to coatings and solvent based cleaning. Where coatings are necessary powder-coated fabrication is preferred to painting and plating. Avoid plated metals especially those using cadmium and chromium as plate material or cyanide or copper/formaldehyde based electroless copper as the plating solution.

- B. Remove all rust, scale, grease and other detrimental foreign matter in accordance with SSPC-SP 3, Power Tool Cleaning, unless conditions/opportunities listed below apply.
 - 1. Use surface preparation classification recommended by paint manufacturer, SSPC or Master Painters Institute (MPI) for paint product used.
 - a. SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations, must be followed for all applicable surface preparation techniques.
- C. Immediately after surface preparation, apply structural steel primer paint where specified, in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 2.0 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces. Use type of primer paint as specified in "Materials" article above. Apply two coats to surfaces that will be inaccessible after erection
- D. Paint all structural steel in accordance with the foregoing specification, except as follows:
 - 1. Steel which is to receive spray-on fireproofing.
 - 2. Within 2" of field welds or welds made after paint is applied.
 - 3. Within 3" of high strength friction bolts.
 - 4. Machined surfaces and threaded parts required for adjustment of the structure. Protect these with suitable rust inhibiting coating which may be removed after final installation of the work so that proper finished coatings may be applied.

3.5 SOURCE QUALITY CONTROL

- A. Refer to testing and inspection requirements specified above in Part 2.

3.6 EXAMINATION

- A. Verify field measurements prior to start of erection. Check the alignment and elevation of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify Commissioner of any errors. Obtain Commissioner's approval of methods proposed for correcting errors prior to proceeding with corrections and erection.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.8 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

- C. Column billets and bearing plates must be supported and aligned on steel wedges, shims, or leveling nuts. After the supported members have been plumbed and properly positioned by instrument and anchor nuts tightened, the entire bearing area under the plate must be packed solidly with grout specified in another Section. Wedges and shims must be set back a minimum of 3/4" from the edges of plates and must be left in place. Leveling plates are not permitted.
- D. Plumbing, Leveling and Bracing
 - 1. Structural steel must be erected true and level, and temporary bracing must be introduced wherever necessary to provide for all loads to which the structure may be subjected, including equipment and the operation thereof. Such bracing must be left in place as long as may be required for safety. No welding may be done or bolts drawn up tight until structural steel has been properly aligned. Obtain approval for guy locations to assure lack of interference with operations of other trades.
- E. Drifting
 - 1. Light drifting necessary to draw holes together will be permitted, but drifting of unfair holes will not be permitted. Twist drills must be used to enlarge holes as necessary to the next larger size; use next larger size bolts as required. Reaming that weakens the members, or make it impossible to fill the holes properly or to adjust accurately after reaming, will not be allowed.

3.9 FIELD CONNECTIONS

- A. In addition to the requirements for shop connections comply with the following:
 - 1. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 2. Joint Type: As noted on structural drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

3.10 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and restore galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 3, Power Tool Cleaning.

- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9.
- D. After erection, all damaged areas in shop coat, exposed surfaces of bolt heads, nuts and washers, and all field welds and unpainted areas adjacent to field welds and high strength bolts must be painted with a "touch-up" application of same paint used in the shop coat and then painted with same paint used for shop coat tinted another color. Retouch in field, any scraped, abraded, and unpainted surfaces. Painting must be as specified for shop coats.
- E. Structural steel which is to support mechanical equipment and will be left exposed to the weather in the finished project must be field painted with one coat of anti-corrosive paint as described in Part 2 for Paint Materials.

3.11 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the DDC General Conditions Section 017419 Construction Waste Management and Disposal and to the maximum extent feasible.
- B. Separate for recycling and place in designated containers the following metal waste in accordance with the Waste Management Plans and local recycler standards: Steel, iron, galvanized steel, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.
- C. Collect all metal cut-offs and scraps and recycle as above.
- D. Fold up metal banding, flatten and place in designated area.
- E. Close and seal tightly all partly used paint and finish containers and store protected in a well-ventilated, fire-safe area at moderate temperature.
- F. Designated un-used paint for:
 - 1. Immediate re-use
 - 2. Long term maintenance needs
 - 3. Recycling by an appropriate facility.
 - 4. Donation
- G. Place empty containers of solvent-based paints in areas designated for hazardous materials.
- H. Do not dispose of paints or solvents by pouring on the ground. Place amounts too small to re-use in designated containers for proper disposal
- I. Place materials defined as hazardous or toxic waste in designated containers.

END OF SECTION 05 12 00

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Roof deck
2. All necessary deck supports and reinforcing other than principal framing members including diagonals at columns, angles, plates, and etc.
3. Waste Management.

B. Related Requirements:

1. Structural steel
2. Shoring of metal deck where unsupported span exceeds the allowable
3. Ceiling systems
4. Mechanical and electrical where supported from deck
5. Fireproofing systems
6. Sheet metal work
7. Waste Management/Recycling Strategies

1.3 PERFORMANCE REQUIREMENTS

- A. Metal deck unit sizes and gages are indicated on the drawings. Gages indicated on the drawings are a minimum. Thickness of deck may be required to be increased by deck manufacturer for loadings indicated on drawings.
- B. Unit must span over three or more supports except where steel layout does not permit.
- C. Maximum allowable deflection under live load plus super imposed dead load must not exceed (1/360) of the span or (1/4) inch whichever is less.
- D. Deck must be sized as unshored. Shoring of deck is not permitted unless specifically shown in areas on the drawings.
- E. Use of piercing, non-piercing, and integral hanger tabs is not permitted at roof deck.
- F. Units included in a fire rated assembly must be classified in appropriate UL design.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
 - B. Product Data: Product data, including manufacturer’s specifications, load tables, section properties and installation instructions for each type of decking and accessories.
 - C. Shop Drawings: Shop drawings for all installations showing gauges, deck layout, type of deck, any shoring required, where located, welding details necessary for fabrication to fit in place, and all accessories. Do not use reproductions of the Design Drawings. In addition include the following:
 - 1. Ceiling tab, fillers, closures and similar items.
 - D. Product Certificates: Certification of specification compliance for each item specified.
 - E. Reports
 - 1. Submit certification of recycled steel content. Certification must clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
 - 2. Submit mill and fabricator certification if in compliance with ISO14001.
 - 3. Submit verification of finishing process:
 - a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) for all shop and field paints used highlighting VOC limits and chemical and mineral component limits.
 - b. For heavy metals in used plating processes: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each plating material and related compounds highlighting chemical component limits.
 - c. Certification of recycled zinc content for galvanized products: Provide cut sheets clearly indicating whether the galvanized products used meet the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
 - 4. Submit verification of biodegradable or low VOC, and low Hazardous Air Pollutants (HAPS) cleaning solutions. Provide a cut sheet and a Material Safety Data Sheet (MSDS) for all cleaning solutions used in the surface preparation of steel components. Highlight VOC limits and chemical component limits.
 - F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
 - 2. Acoustical roof deck.
 - G. Evaluation Reports: For steel deck.
- 1.5 QUALITY ASSURANCE
- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

- B. Except as modified by governing codes and by this specification, comply with the applicable provisions and recommendations of the following codes and standards:
1. New York City Building Code, 2008
 2. American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members".
 3. American Welding Society (AWS), D1.1 "Structural Welding Code" and D1.3 "Structural Welding Code-Sheet Steel".
 4. Steel Deck Institute (SDI) "Design Manual for Composite Decks, Form Decks, and Roof Decks".

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. However, efforts should be made to minimize the disturbance to site and soil conditions for example, by not requiring excessive areas to be put aside for on-site storage.
- B. Store materials to permit easy access for inspection and identification. Keep all materials in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect all materials from corrosion and deterioration, discoloration or staining. Make efforts to minimize any waste and ensure that as much waste as possible is recycled.
- C. Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Correct or replace damaged materials or structures as directed.

1.7 PROJECT CONDITIONS

- A. Examine all work prepared by other trades to receive work of this section and report any defects affecting installation to the contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.
- B. If the supporting beams are not properly aligned or sufficiently level to permit proper bearing of the steel decking units, the steel decking subcontractor must bring the matter to the attention of the contractor for corrective action. The steel decking units are not to be placed until the necessary correlations are made.
- C. Installation of the deck and shear studs will be inspected by Commissioner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 MANUFACTURERS

- A. Supply manufactured deck units in accordance with the applicable requirements of the Steel Deck Institute's "Design Manual for Floor Decks and Roof Decks".

B. Deck must be manufactured by one of the following:

1. United Steel Deck (manufactured by Canam)
2. Wheeling Corrugating Co.
3. Vulcraft
4. Or approved equal

2.3 DECK MATERIALS

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, with the minimum section properties indicated on the drawings. Contractor may provide heavier gauge if minimum gauge indicated is not adequate to support total loads as shown on the drawings.
- B. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, with the minimum section properties indicated on the drawings. Contractor must provide heavier gauge if minimum gauge indicated is not adequate to support total loads as shown on the drawings.

2.4 ACCESSORIES

- A. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- C. Anchor clips, vent clips, welding washers, flashing, saddle plates, sump pans, other accessories must be those types, sizes, and configurations recommended by the decking manufacturer, and must be of the same material and finish as the deck units. All accessories must conform to ASTM A653/A63M.
- D. Cell closure flexible strips, and fillers must be of material in compliance with the 2008 New York City Building Code
- E. Roof sump pans: Fabricate from a single piece of galvanized sheet steel of the same quality as the deck units; not less than nominal 0.0747" (14 gauge) thick before galvanizing; with bottoms level after erection and sloping sides to direct water flow to the drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below the roof deck surface, unless otherwise shown or required by deck configuration. Weld to deck at maximum 12" o.c.
- F. Paint: Where indicated on drawings, must be compatible with galvanized surfaces such that minimal preparation is required.
1. For decks exposed to exterior conditions or high humidity paint must
 - a. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
 2. For all decks paint must

- a. Demonstrate a minimum opacity as determined by ASTM D 2805
 - b. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
3. The product must not contain any of the prohibited compounds as listed in Green Seal *Standard for Paintings and Coatings*, GS-11, latest edition and in Master Painters Institute (MPI) *Green Performance Standard*, GPS-1-08.
 4. The product must meet the VOC limits as set forth in the MPI Green Performance Standard, GPS-1-08, with a maximum allowable VOC of 340 g/L for rust preventative coatings. Limits are expressed in THINNED state. Preference will be given to products with the least crystalline silica content.

2.5 FABRICATION

- A. Fabricate deck units in accordance with the AISI's "Specification for the Design of Cold-Formed Steel Structural Members" and accepted shop drawings. Fabricate deck units to the sizes and configurations indicated and cut to lengths which will span not fewer than three supporting members; use only full length units at overhang where indicated in a manner that laps fit tightly. Locate openings for penetrations where indicated and provide support framing and edge reinforcement for all openings.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements

3.2 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section. Erection must closely follow the erection of structural steel.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members as per load schedule provided on contract documents.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, conti-

nunity of deck, and support of other work, per drawings and manufacturer's specifications and .

- F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- G. Headed shear studs must be installed by welding through metal deck onto beam below. Automatic welding machinery of approved design, amperage, duration of current, etc., must be used. Studs must be tested by testing laboratory in accordance with AWS Procedures for Bend Test; replace all studs which do not pass test.
- H. All welding must be performed by competent experienced welding mechanics. All welds must be given a protective coat of paint as specified in painting article of section 051200.
- I. All abraded or damaged protective surfaces of steel decking work must be touched up with a protective coat of paint by the contractor as erected.

3.4 ROOF DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members per drawings.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports per drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing per manufacturer's specification but not less than 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.
- D. All unframed openings in roof deck must be reinforced per the drawings.
- E. Roof sump pans: Fabricate from a single piece of galvanized sheet steel of the same quality as the deck units; not less than nominal 0.0747" (14 gauge) thick before galvanizing; with bottoms level after erection and sloping sides to direct water flow to the drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below the roof deck surface, unless otherwise shown or required by deck configuration. Weld to deck at maximum 12" o.c.
- F. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
 - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

- A. Special Inspection as required by the 2008 New York City Building Code of all metal decking will be performed by an inspection agency retained by the City of New York. The inspection agency must work under the direction of the Commissioner. Contractor must provide the inspection agency with the following:

1. Schedule of all work in field with at least ten days' written notice before commencement of either activity.
 2. A complete set of approved shop and erection drawings.
 3. Order sheets, material bills, shipping bills and mill test reports.
 4. Representative sample pieces as requested by the testing agency.
 5. Full and ample means and assistance for testing all material.
 6. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.
- B. Each person installing connections must be assigned an identifying symbol or mark and all shop and field connections must be so identified so that the inspector can refer back to the person making the connection.
- C. The following minimum criteria must be adhered to in testing of welds:
1. All welds must be examined by visual means.
 2. 25% of all welds, selected randomly, must be measured.
 3. In addition, all welds subject to tensile stress must be examined by the Ultrasonic Method for 100% of their length.
 4. 10% of all manual fillet welds must be tested by the magnetic particle method.
 5. 1'-0" at each end of automatic fillet welds must be tested by the magnetic particle method.
 6. 100% of groove welds must be tested by the ultrasonic method.
- D. Field inspection will include examination of decking for welding and touching-up of shop coat.
- E. Inspection of welding will be such as to assure that the work is within the quality requirements specified below and elsewhere in this section of the specifications and will include:
1. Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW welding processes conform to the requirements of this section of the specifications.
 2. Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Commissioner.
 3. The testing agency must be prepared to utilize the following approved methods of testing:
 - a. Liquid penetrant inspection: ASTM E 165.
 - b. Magnetic particle: ASTM A 709.
 - c. Radiographic inspection: ASTM E 94 and E 1032.
 - d. Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C.
- F. When defects are revealed, additional inspection by whatever method is deemed necessary by the inspector, must be performed to the extent necessary to assure that the full amount of defect has been located. No further work may be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects must be restored, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the weld must be by the same method that was used to reveal the defect. A second restoration of a defective area must not be made without approval of the Commissioner.
- G. A distinguishing mark will be placed on all work that has been inspected and approved. Mate-

rial or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR" marked directly on the material or work.

- H. Testing agency will report inspection results promptly and in writing to Contractor and Commissioner.
- I. Remove and replace work that does not comply with specified requirements.
- J. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 CLEANING UP

- A. Remove all equipment, unused materials and debris from the site immediately upon the completion of this work.

3.7 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the DDC General Conditions Section 017419 Construction Waste Management and Disposal and to the maximum extent feasible.
- B. Separate for recycling and place in designated containers the following metal waste in accordance with the Waste Management Plans and local recycler standards: Steel, iron, galvanized steel, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.
- C. Collect all metal cut-offs and scraps and recycle as above.
- D. Fold up metal banding, flatten and place in designated area.
- E. Close and seal tightly all partly used paint and finish containers and store protected in a well-ventilated, fire-safe area at moderate temperature.
- F. Designated un-used paint for:
 - 1. Immediate re-use
 - 2. Long term maintenance needs
 - 3. Recycling by an appropriate facility.
 - 4. Donation
- G. Place empty containers of solvent-based paints in areas designated for hazardous materials.
- H. Do not dispose of paints or solvents by pouring on the ground. Place amounts too small to re-use in designated containers for proper disposal
- I. Place materials defined as hazardous or toxic waste in designated containers.

END OF SECTION 05 31 00



SECTION 05 40 00

COLD FORMED METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. "C" shaped steel studs for exterior non-load bearing wall frame construction.
2. Coordinate with thermal broken panel attachment per Section 074213.
3. "C" shaped steel joists.
4. Anchors and accessories.
5. Gypsum sheathing.
6. Field inspection.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 05 12 00 "Structural Steel Framing"
3. Section 07 21 00 "Thermal Insulation"
4. Section 07 27 00 "Air Barriers"
5. Section 09 29 00 "Gypsum Board" for interior steel stud construction.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: For information only, submit copies of manufacturer's product information and installation instructions for each item of cold-formed framing and accessories.
- C. Shop Drawings



1. Submit shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data. Include placing drawings for framing members showing size and gauge designations, number, type, location and spacing. Indicate supplemental bracing, splices, window and door headers accessories and details as may be required for proper installation.
 2. If the Contractor elects to prefabricate framing members into panels for erection, the Contractor must submit shop drawings of such panels at suitable scale showing all dimensions, components, and methods of fastening and support.
- D. For fasteners, submit product data sheet and samples.
- E. Engineering Data
1. Submit Engineering Data drawings to the Commissioner for review. The Contractor is responsible for the structural engineering services and supports for the cold-formed metal frame and must show the proposed system and how the Performance Criteria noted below is accommodated on these drawings.
 2. These drawings must show all load conditions and engineering calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of New York and must be signed and sealed by this Engineer.
- F. Quality Assurance Submittals: Submit the following:
1. Qualifications: Proof of manufacturer, installer, and welder qualifications.
 2. Structural engineering services calculations.
 3. Certificates
 - a. Submit mill certificates signed by framing member/accessory manufacturer certifying compliance with material requirements.
 - b. Welder certificates.
 4. Manufacturer's installation instructions for framing members and framing accessories.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Component Engineering: Compute structural properties of studs in accordance with AISI "North American Specification for the Design of Cold Formed Steel Structural Members."
- C. Fire-Rated Assemblies: Where framing units are indicated to be components of fire-resistance rated assemblies, provide cold-formed metal framing identical to that of



assemblies tested for fire resistance per ASTM E 119. Products used in the assembly must carry a classification label from an approved testing and inspection agency.

D. Qualifications

1. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M "Structural Welding Code - Steel" and AWS DL3 "Structural Welding Code – Sheet Steel."

E. Pre-Installation Meeting

1. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: City of New York, Commissioner, Contractor and installer.
2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
3. Keep minutes of meeting, including responsibilities of various parties and deviations from specifications and installation instructions. Distribute minutes to attendees within 72 hours.

F. Comply with the following standards:

1. American Iron and Steel Institute (AISI):
 - a. "North American Specification for the Design of Cold-Formed Steel Structural Members," latest edition.
 - b. "Standard for Cold-Formed Steel Framing General Provisions."
2. American Welding Society (AWS):
 - a. Structural Welding Code (D1.1).
 - b. Specifications for Welding Sheet Steel in Structures (E1.3).
3. ASTM:
 - a. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - b. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - c. ASTM A 924 - Standard Requirements for Sheet Steel, Metallic-Coated by the Hot-Dipped Process.
 - d. ASTM C 955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
 - e. ASTM A 1003 - Standard Specification for Steel Sheet, Carbon, Metallic- and Non-Metallic-Coated for Cold-Formed Framing Members.



- f. ASTM C 1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
 - g. ASTM C 1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- G. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test.

1.5 PRODUCT DELIVERY AND STORAGE

- A. Protect metal framing units from rusting and damage. Deliver to one project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings. Conform to storage and handling requirements of AISI "Code of Standard Practice."

PART 2 PRODUCTS

2.1 PERFORMANCE CRITERIA

- A. Cold-formed metal framing system must be engineered, fabricated, and installed to withstand a 30 psf suction and pressure load (or greater if required by 2008 New York City Building Code) with a maximum deflection of L/360 with metal panels.
- B. Engineer system to accommodate vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges and construction tolerances.

2.2 MANUFACTURER

- A. Provide cold-formed steel framing manufactured by Marino/Ware, Dale/Incor, Superior Steel Studs, ClarkDietrich Building Systems, Super Stud Building Products, or approved equal.

2.3 METAL FRAMING: GENERAL

- A. System Components: With each type of metal framing required, provide manufacturer's standard steel runners, (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories, as recommended by manufacturer for the applications indicated, as needed to provide a complete metal framing system.

2.4 MATERIALS

- A. Steel Sheet for Studs and Tracks: ASTM A 1003 Structural Grade, Type H, metallic coated, of grade and coating weight as follows:



1. Grade: As required by structural performance.
 2. Coating: G90 galvanized coating.
- B. Steel Sheet for Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
1. Grade: As required by structural performance.
 2. Coating G90 galvanized coating.

2.5 FRAMING MEMBERS

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges; thickness and grade as required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths compatible with studs, un-punched, with un-stiffened flanges; thickness and grade as required by structural performance.

2.6 FRAMING ACCESSORIES

- A. Stamp manufacturer's name on each accessory item.
- B. Provide screws with accessories designated for screw attachment.
- C. Connector Devices
1. Vertical Deflection Clips: "VertiClip," including step bushings, as manufactured by The Steel Network Inc., "FastClip" By ClarkDietrich Building Systems, "ESC" by Scafc, or approved equal. Rigid attachments to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils minimum thickness, size as required by structural engineering calculations.
 2. Rigid Clip Angles: "StiffClip" as manufactured by The Steel Network Inc., "EasyClip" By ClarkDietrich Building Systems, "Secure Clip" by Scafc, or approved equal, size as required by structural engineering calculations. Rigid attachment to structure and stud web.
- D. Bridging
1. Cold Rolled Channel: 1-1/2" by 1/2" by 56 mil thick.
 - a. Bridging Clip: "BridgeClip" as manufactured by The Steel Network Inc., "FastBridge" by ClarkDietrich Building Systems, "Secure Bridge Clip" by Scafc, or approved equal. Provide attachment through stud punch-out clamping onto stud web and wrapping around bridging channel. Provide holes for screw attachment to stud web and channel.



2. Flat Strap: Width and thickness as required by structural engineering calculations. Rigid attachment to stud flange.
 3. Solid Bridging: Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. 33 mils minimum thickness, size as required by structural engineering calculations.
 4. Bridging and accessories must be hot dip zinc coated per ASTM A 153.
- E. Header for Window and Door Openings: Provide system complete with all accessories including clips and accessories; finish and gauge to match studs.

2.7 FASTENERS

- A. Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural engineering calculations.
- B. Anchor Bolts and Studs: ASTM A 307, Grade A, carbon steel, with hex-head carbon steel nuts and flat steel washers. Hot-dip zinc coated in accordance with ASTM A 153. Provide bolt or stud type and size as required by structural engineering calculations.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

2.8 GALVANIZING TOUCH-UP

- A. For touching up damaged galvanized surfaces after erection, provide "Silver Galv" made by Z.R.C. Worldwide, "Brite Zinc" by Brite Products, "ZiRP" by Duncan Galvanizing Corp., or approved equal. Apply to a dry film thickness of 1.5 to 3.0 mils.

2.9 GYPSUM SHEATHING AND RELATED ACCESSORIES

- A. Gypsum Sheathing: 5/8" thick "Dens-Glass Fireguard," Type X, made by Georgia Pacific, "Securock Glass-Mat Sheathing" made by U.S. Gypsum Co., "Gold Bond EXP Extended Exposure Sheathing" made by National Gypsum Co., "Weather Defense" made by Lafarge/Continental, or approved equal, meeting ASTM C 1177, Type X.
- B. Fasteners: 1-1/4" Type S-12 screws with corrosion-resistant finish.
- C. Joint Treatment: Provide a one-part high performance sealant conforming to ASTM C 920, Type S, Grade NS, Class 25 meeting with the approval of the air/vapor barrier manufacturer for compatibility; see Section 07 27 00 "Air Barriers" for description.



Apply a 3/8" bead of sealant to the joint and trowel flat. Apply enough of the same material to each fastener to cover completely when trowelled flat.

2.10 FABRICATION

- A. Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion in any members in the assembly.
- B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting or screw fasteners, as standard with manufacturer.
- C. Wire tying of framing components is not permitted.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION: GENERAL

- A. Methods of construction must be piece by piece.
- B. Connections must be accomplished with self-drilling screws or welding so that the connection meets or exceeds the design loads required at that connection.
- C. Studs must be installed seated squarely (within 1/16") against the web portion of the top and bottom tracks. Tracks must rest on a continuous, uniform bearing surface.
- D. Cutting of steel framing members may be accomplished with a saw or shear. Torch cutting of loaded members is not permitted. Cutting of loaded members is not permitted unless under supervision of the Commissioner.
- E. Provide temporary bracing and leave in place until work is permanently stabilized.
- F. Bridging must be of size and type shown on the approved shop drawings and as called for in the engineering calculations.
- G. Install headers in all openings that are larger than the stud spacing in that wall. Form headers as shown on the drawings.
- H. Place insulation meeting the requirements of Section 07 21 00, Thermal Insulation, in all jamb and header type conditions that will be inaccessible after their installation into the wall.
- I. Provide jack studs to support each end of headers. Securely connect these studs to the header, seat squarely in the lower track of the wall, and properly attach to it.



- J. If a header is low in the wall, engineer the less than full-height studs (cripples) that occur over the header to carry all imposed loads.
- K. Do not use wall track to support any load unless specifically engineered for that purpose.
- L. Align all axially loaded members vertically, to allow for full transfer of the loads down to the foundation. Maintain vertical alignment at floor/wall intersections or alternate provisions for load transfer may be made.
- M. Provide holes that are field cut into steel framing members within the limitation of the product and its engineering. Provide reinforcement where holes are cut through load bearing members in accordance with manufacturer's recommendations and as approved by the Commissioner.
- N. Touch up all steel bared by welding using touch-up coating specified herein.
- O. Space studs to suit the engineering requirements and limitations of collateral facing materials.
- P. Care should be taken to allow for additional studs at intersections, corners, doors, windows, control joints, etc., and as called for in the shop drawings or engineering calculations.
- Q. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- R. Provide for structure movement, expansion must be allowed where indicated and necessary by engineering or 2008 New York City Building Code requirements.
- S. Frame both sides of expansion and control joints with separate studs; do not bridge the joint with components of stud system.
- T. Install horizontal bridging in stud system, spaced (vertical distance) at not more than 48 inches on center. Fasten at each intersection.
- U. Splicing of axially loaded members or floor joists will not be permitted.
- V. Wire tying of members is not permitted.

3.3 INSTALLATION OF GYPSUM SHEATHING

- A. Fasten sheathing to exterior of each stud with specified fasteners spaced 3/8" from ends and edges and approx. 8" o.c. at each stud. Install fasteners in accordance with manufacturer's recommendations using 2500-RPM maximum screw gun. Install



sheathing board horizontally. Apply sealant between joints and trowel flush; and apply sealant around sheathing perimeter and at interface with other materials. Cover fastener heads with sealant and trowel flush.

END OF SECTION 05 40 00



**Department of
Design and
Construction**

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Rough hardware.
2. Alternating tread stair.
3. Ship's ladders.
4. Steel service stairs.
5. Loose steel lintels.
6. Light steel framing and supports, not included as part of work of other trades.
7. Steel gratings and frames.
8. Steel plate covers and frames.
9. Structural steel door frames at service doors.
10. Cast thresholds.
11. Elevator divider beams, guide rail beams and elevator pit hold down beams.
12. Steel dunnage beams; refer to Structural documents.
13. Miscellaneous steel trim, corner guards, angle guards and channels.
14. Countertop supports.
15. Trench drains.
16. Masonry support steel.
17. Sleeves in concrete walls and slabs.



18. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.
19. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
20. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

B. Related Sections

1. Section 05 12 00 "Structural Steel Framing"
2. Section 09 90 00 "Painting and Coating"

1.3 PERFORMANCE STANDARDS

- A. Engineer stairs and railings to resist loads per 2008 New York City Building Code.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Manufacturer's Literature: Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.
- C. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.
- D. Engineering Data
1. Before any stairs, ladders or railings are fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here will be met. The Contractor is responsible for the structural design and supports for these systems and must show the proposed systems on these drawings.
 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members.
 3. Contractor to engage a Structural Engineer licensed in the State of New York to prepare calculations and drawings. Calculations and drawings must be signed and sealed by this Engineer.



- E. Indicate welding on shop drawings using AWS symbols and show length, size and spacing (if not continuous). Show auxiliary views to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.
- F. Certification: For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate must be signed by the galvanizer and must contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- C. Reference Standards: The work is subject to requirements of applicable portions of the following standards:
 - 1. "Manual of Steel Construction," American Institute of Steel Construction.
 - 2. AWS D1.1 "Structural Welding Code," American Welding Society.
 - 3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.
 - 4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.
 - 5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.
- D. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
- E. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of three years and must provide the Commissioner with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.



- F. Inspection and testing of hot-dip galvanized coating must be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."
- G. Installer Qualifications: An entity meeting the requirements of DDC General Conditions Section 014000 1.7/C/1.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metals

- 1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
 - 2. Steel Plates, Shapes and Bars: ASTM A 36.
 - 3. Steel Bar Grating: ASTM A 1011 or ASTM A 36.
 - 4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
 - 5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
 - 6. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
 - 7. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
 - 8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
 - 9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
 - 10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
 - 11. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 03 30 00 Cast-in-Place Concrete.



- C. Fasteners
 - 1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
 - 2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
 - 3. Anchor Bolts: ASTM F 1554, Grade 36.
 - 4. Lag Bolts: ASME B18.2.1.
 - 5. Machine Screws: ASME B18.6.3.
 - 6. Plain Washers: Round, carbon steel, ASME B18.22.1.
 - 7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
 - 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
 - 9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.
- D. Prime and paint all metal per Section 09 90 00 Painting and Coating.
- E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.
- F. Galvanizing Repair Coating: For touching up galvanized surfaces after erection, provide repair coating that is V.O.C. compliant. Apply to a dry film thickness of 1.5 to 3.0 mils.
 - 1. Product: Subject to compliance with requirements, provide one of the following:
 - a. Z.R.C. Worldwide; Silver Galv
 - b. Brite Products; Brite Zinc
 - c. Duncan Galvanizing Corp.; ZiRP
 - d. Or approved equal.

2.2 PRIME PAINTING

- A. Scope: Clean all ferrous metal (except galvanized steel) and shop paint with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.
- B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.
 - 1. Steel to get high performance coating as noted in Section 09 90 00 Painting and Coating must be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."



C. Application

1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces must be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.
2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures must be only as stated in said instructions.
3. Paint must uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work may be shipped until the shop prime coat thereon has dried.

D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.

E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 GALVANIZING

A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, must be cleaned and then hot-dipped galvanized after fabrication.

B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot-dip galvanized. Fabricator must consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.

C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.

D. Application: Hot-dip galvanizing must conform to the following::

1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.
2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware - Table 1.



4. ASTM A 384: Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
 5. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
 6. ASTM A 924: Galvanized Coating on Steel Sheets.
 7. Minimum weight of galvanized coating must be two (2) oz. per square foot of surface.
- E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.
- G. To minimize surface imperfection (eg: flux inclusions), dip material to be galvanized into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.
- H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece must be rejected and replaced to the acceptance of the Commissioner.

2.4 PROTECTIVE COATINGS

- A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which must be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.5 WORKMANSHIP

- A. General
1. Miscellaneous metal work must be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
 2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection must be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.



3. All work must be accurately and neatly fabricated, assembled and erected.
- B. Shop Assembly: Insofar as practicable, fitting and assembly of work must be done in shop. Shop assemble work in largest practical sizes to minimize field work. Ensure that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item must be returned to the shop for correction.
- C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.
- D. Holes: Drill or cleanly punch holes; do not burn.
- E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and contraction joints to allow for thermal movement of metal at locations and by methods approved by the Commissioner.
 1. Welding
 - a. Must be in accordance with AWS D1.1 Structural Welding Code of the American Welding Society, and must be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
 - b. Welds must be continuous, except where spot welding is specifically permitted. Welds exposed to view must be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
 - c. All welds on or behind surfaces which will be exposed to view must be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.
 2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view must be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.
- F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work must be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.
- G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.



- H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- I. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- J. Exposed Work
 - 1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view must be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.
 - 2. Metal work exposed to view must be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.
 - 3. Exposed fastenings, where permitted, must be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and must be of the smallest practicable size.
- K. Preparation for Hot-Dip Galvanizing: Fabricator must correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation must include but not be limited to the following:
 - 1. Remove welding flux.
 - 2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

2.6 MISCELLANEOUS METALS ITEMS

- A. Rough Hardware
 - 1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Section 06 20 00 Finish Carpentry.
 - 2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.



B. Alternating Tread Stair

1. Materials

a. Stainless Steel

- 1). Treads: 13 Gauge AISI 316 SS
- 2). Landing & Foot Stampings: 11 Gauge AISI 316 SS
- 3). Stringers:
 - (a). 2" x 1 3/4" x 11 Gauge U section; Minimum 36 ksi yield stress, AISI 316 SS for 56 degree stairs under 10 vertical feet and for 68 degree stairs under 12 vertical feet.
 - (b). 3" x 1 3/4" x 11 Gauge U section; Minimum 36 ksi yield stress, AISI 316 SS 56 degree for stairs over 10 vertical feet and for 68 degree stairs over 12 vertical feet.
- 4). Handrails: 1 1/2" OD x 0.065" 316 SS cold drawn, Minimum 42 ksi yield stress, fully annealed tube per ASTM A269 seamless or ASTM A554 welded.

b. Fasteners

- 1). Bolts: handrail to stringer; Hex Head SAE J429 Grade 5, 1/2" Φ x 13 TPI; Landing to structure; Carriage Head A307 or Hex Head SAE J429 Grade 5, 1/2" Φ x 13 TPI ; dimensions per ANSI/ASME B18.2.1
- 2). Nuts: ASTM A563 Grade A, B, C, D or O; dimensions per ANSI/ASME B18.2.2.
- 3). Washers ASTM F436 or F844, dimensions per ANSI/ASME B18.2.1

2. Finish: Manufacturer's standard finish

3. Basis-of-Design Product: Subject to compliance with requirements, provide Lapeyre Stair Inc.; Alternating Tread Stairs, 56 degree angle, or comparable product by one of the following:

- a. Precision Ladders, LLC
- b. FS Industries.
- c. Vestil
- d. Or approved equal.

C. Ladders

1. Provide sloping ladders (ship's ladders) where noted. Fabricate open type construction with structural steel channel or steel plate stringers, pipe handrails, and open steel grating treads. Provide all necessary brackets and fittings for installation.
2. Ladders must be fabricated to support a live load of one hundred (100) lbs. per square foot and a concentrated load of three hundred (300) lbs. per rung; loads not to act simultaneously.



3. Basis-of-Design Product: Subject to compliance with requirements, provide Alco; 80 degree Pivotal Ships Ladder or comparable product by one of the following:
 - a. Precision Ladders, LLC
 - b. O'Keefe's
 - c. Or approved equal.

D. Service Stairs

1. General: Construct stairs to conform to sizes and arrangements shown; joint pieces together by welding. Provide complete stair assemblies, including metal framing, hangers, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.
2. Stair Framing: Fabricate stringers of structural steel members, channels, or plates, or a combination thereof. Fabricate as per the Structural design. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to strings and newels and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.
3. Attach treads to stringers by means of support angles on tread screw bolt into threaded stringer made of steel and angles or bars. Weld brackets to strings and attach metal treads to brackets by welding, riveting or bolting.
4. Provide platforms of same metal as treads and in thicknesses required to support design loading. Attach platform to platform framing members with welds.
5. Steel Treads and Platforms
 - a. Interior Stair Treads: Provide treads in sizes and thickness as shown on drawings. Provide anti-slip stainless steel surface covering 100% of substrate consisting of a random hatch matrix with a surface hardness between 55 – 63 on the Rockwell 'C' scale and a bond strength of at least 4,000 psi. Non-slip surface must have a minimum coefficient of friction of 0.8 and be listed as slip-resistant by Underwriters Laboratories.
 - 1). Basis-of-Design Product: Subject to compliance with requirements, provide W.S. Molnar Company; SlipNOT "Perf Tread – L-Shape" grit-free, stainless steel Grip Plate/ Grip Grate Grade #1 - Fine or comparable product by one of the following:
 - (a). Harsco Industrial IKG.
 - (b). McNichols
 - (c). Or approved equal.
 - b. Exterior Stair Treads: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."



- 1). Fabricate treads and platforms from pressure-locked steel grating with 1-1/2" x 1/8" bearing bars at 1-3/16" o.c. and crossbars at 4" o.c., plain surface, galvanized finish.
- 2). Fabricate grating treads with cast abrasive, diamond-plate steel nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts. Weld risers to back of tread.
- 3). Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Weld grating to platform framing.

E. Loose Steel Lintels

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than eight (8) inches bearing at each side of openings, unless otherwise indicated.
2. Loose lintels must conform to the following Schedule:

Opening Width (Maximum)	Wall Thickness		
	4 inches	6 inches	8 inches*
2'-0"	3-1/2" x 3-1/2" x 1/4"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 1/4"
3'-0"	3-1/2" x 3-1/2" x 5/16"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 5/16"
4'-0"	3-1/2" x 3-1/2" x 5/16"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 5/16"
5'-0"	4" x 3-1/2" x 3/8"	6" x 4" x 3/8"	4" x 3-1/2" x 5/16"
6'-0"	5" x 3-1/2" x 3/8"	6" x 4" x 3/8"	5" x 3-1/2" x 5/16"
7'-0"	5" x 3-1/2" x 3/8"	5" x 5" x 1/2"	5" x 3-1/2" x 3/8"
8'-0"	5" x 3-1/2" x 3/8"	5" x 5" x 5/8"	5" x 3-1/2" x 3/8"

* Two angles at all openings in eight (8) inch walls.

3. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles sized for structural capacity of lintel.

F. Miscellaneous Light Steel Framing



1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., must be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and must be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
2. All light steel framing steel must be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.

G. Steel Gratings and Frames

1. Provide hot dipped galvanized steel gratings complying with FS RR-G-661 with rectangular cross bars welded to bearing bars. Bars to have plain wearing surface.
2. Manufacturer: Provide gratings manufactured by Reliance, Borden, Irving Subway Grating, or approved equal.
3. Hinged Section: Provide hinged sections in areaway gratings where required by the drawings. Each hinged section up to 4'-0" wide must be provided with two (2) five knuckle, fast pin, regular weight, plain bearing, wrought bronze butt hinges. Each hinged section over 4'-0" wide must be provided with three (3) butt hinges. Hinged sections must have provisions for padlocking on the underside.
4. Furnish grating frames, with corners mitered, welded and ground smooth, and with welded-on straps for secure anchorage into concrete. Frames and anchors to be galvanized.
5. Structural Performance: Provide gratings capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections:
 - a. Floors: Capable of withstanding a uniform load of 250 lbf/sq. ft. or a concentrated load of 3000 lbf, whichever produces the greater stress.
 - b. Walkways and Elevated Platforms Other Than Exits: Capable of withstanding a uniform load of 60 lbf/sq. ft. Limit deflection to L/360 or 1/4", whichever is less.
 - c. Walkways and Elevated Platforms Used as Exits: Capable of withstanding a uniform of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress. Limit deflection to L/360 or 1/4", whichever is less.

- H. Pit Covers and Frames:** Provide minimum 1/2" thick steel checkered plate cover, reinforced as required to limit deflection to 1/360 of span, with two (2) recessed lifting handles capable of supporting five hundred (500) lbs. each. Furnish covers with steel angle frames, with corners mitered, welded and ground smooth, and with welded-on



straps for secure anchorage into concrete. Frames and anchors to be galvanized. Plate covers must be capable of supporting same loads as adjacent floor surfaces.

I. Structural Steel Door Frames

1. Fabricate steel door frames of structural shapes and bars, fully welded, uniform, square and true. Plug weld built-up members, continuously weld exposed joints; grind exposed welds smooth. Provide 5/8" x 1-1/2" steel bar stops. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than ten (10) inches o.c.
2. Provide necessary reinforcements and drill and tap as required for finish hardware.
3. Provide steel strap anchors for securing door frames into adjoining concrete or masonry, using 1/8" x 2" straps of the length required for a minimum eight (8) inch embedment. Weld anchors to frame jambs no more than twelve (12) inches from both bottom and head of frame and space anchors not more than thirty (30) inches apart.
4. Extend bottom of frames to floor elevation and secure to concrete with steel angle clips welded to frames, anchored with expansion shields and bolts.

J. Cast Thresholds

1. Fabricate of sizes and configurations as shown. Provide cast iron units with integral abrasive finish. Furnish in lengths as required to accurately fit each opening or condition.
 - a. Cast units with an integral abrasive grit consisting of aluminum oxide, silicone carbide, or a combination of both.
2. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
 - a. Provide two (2) rows of holes for units over five (5) inches wide, with two (2) holes aligned at ends and staggered intermediate holes.
3. Apply black asphaltic coating to concealed bottoms, sides and edges of cast iron units set into concrete.
4. Provide a diamond surface texture.

- K. Miscellaneous Steel Trim:** Provide shapes and sizes for profiles shown. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.



- L. Corner Guards: Provide stainless steel corner guards as specified in Section 05 70 00, Decorative Metal.
- M. Countertop Supports: Steel framing as indicated or required to support countertops. Conceal framing under countertops and within wall behind countertops. Provide supports to withstand a concentrated load of not less than three hundred (300) lbs. applied at any point with a deflection not to exceed L/240 for the length of the countertop.
- N. Trench Drains: Provide Smith Aco 9870-465-SSP heavy-duty perforated stainless steel grate as manufactured by Jay R. Smith Mfg. Co., or comparable product by Zurn, McNichols or approved equal, sizes as shown on drawings. Assembly must have asphalt coating. Grate must be bolted in place with stainless steel hex head cap screws.
- O. Masonry Support Steel: Provide galvanized steel, relieving angles, plates, accessories and other steel shapes for masonry support steel; for lintels refer to Para. E. herein.
 - 1. Fabricate masonry support steel to allow final adjustment with the closest tolerances possible. Relieving angles which require cutting to fit masonry flashing must be straightened without deflections.
 - 2. Coordinate masonry support system with concrete work for locations of wedge inserts.
 - 3. Install to meet requirements of building masonry work, face brick coursing and stone placement. Coordinate final adjustments with masonry work as work progresses.
- P. Sleeves in Concrete Walls and Slabs
 - 1. Provide sleeves through concrete walls of Schedule 40 steel pipe with i.d. two (2) inches larger than o.d. of pipe or conduit (including insulation, if any) to be accommodated. Sleeves will project one-half (1/2) inch on each side of finished wall. Provide rectangular one-quarter (1/4) inch steel plate collar at center, continuously welded to the perimeter of the sleeve, and six (6) inches wider than the o.d.
 - 2. Slots in slabs: 12 gauge steel sheet, galvanized, of dimensions indicated, with strap anchors welded in place not more than twelve (12) inches on centers.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSTALLATION

- A. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. **Cutting, Fitting and Placement:** Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- C. **Fitting Connections:** Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. **Field Welding:** Comply with AWS D1.1 for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.
- E. **Touch-Up Painting:** Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- F. **Field Touch-Up of Galvanized Surfaces:** Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

END OF SECTION 05 50 00



SECTION 05 70 00

DECORATIVE METAL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Stainless steel handrails and brackets.
2. Stainless steel tube sidewall support.
3. Stainless steel countertop with integral sink.
4. Stainless steel bollards.
5. Stainless steel corner guards.
6. Metal clad stair sidewalls.
7. Steel awnings at doors.
8. Aluminum canopy over Stair 2.

B. Related Sections

1. Section 05 50 00 "Metal Fabrications"
2. Section 14 24 00 "Hydraulic Elevators" for elevator entrances.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings: Submit for all items of work of this Section, as enumerated under paragraph 1.2, showing locations, layouts, materials, thicknesses, finishes, dimensions, construction, relation to adjoining construction, erection details, profiles, jointing and all other details to fully illustrate the work of this Section.
- C. Samples: Submit fabricated samples (of sufficient size to fully show construction, materials and finishes) of all items of work as enumerated under paragraph 1.2 herein.



- D. Product Data: Submit manufacturer's, fabricator's and finisher's specifications and installation instructions for products used in ornamental metal work, including finishing materials and methods.
- E. Samples for verification: For each type of exposed finish required, prepared on 1500 mm square samples of metal of same thickness and material indicated for the Work.
- F. Contractor Licensed Engineer Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Professional Engineer licensed in the State of New York responsible for their preparation.
- G. Coordination Drawings: For decorative formed metal elements that house items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments and necessary clearances.
- H. Engineering Data
 - 1. Before any railings and supports are fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here will be met. The Contractor is responsible for the structural design and supports for these systems and must show the proposed systems on these drawings.
 - 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of New York and must be signed and sealed by this Engineer.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay the work.
- C. Shop Assembly: Insofar as practicable, fitting and assembly of work will be done in shop. Work that cannot be permanently shop assembled, will be completely assembled, marked and disassembled in shop before shipment to ensure proper assembly in field. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the Contractor for this work to ensure that the shop fabricated items will properly fit the field condition. In the event that shop fabricated items do not fit the field condition, the item will be returned to the shop for correction.

1.5 PERFORMANCE STANDARDS

- A. Engineer railings and guardrails to resist loads per 2008 New York City Building Code.



- B. Submit calculations and drawings signed and sealed by a Professional Engineer licensed in the State of New York indicating that railing system can meet these performance criteria.

1.6 COORDINATION

- A. Coordinate installation of anchorages for decorative formed metal items. Furnish setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors, that are to be embedded in concrete to masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of decorative formed metal with adjacent construction to ensure that wall assemblies, flashings, trim and joint sealants, are protected against damage from the effects of weather, age, corrosion and other causes.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning," stains, discolorations, or other imperfections on the finished units will not be acceptable.
- B. Aluminum
 - 1. Comply with the following standards for the forms and types of aluminum for the required items of work.
 - a. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher.
 - b. Aluminum Plate and Sheet: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209, alloy 6061-T6.
- C. Stainless Steel
 - 1. Comply with the following standards for the forms and types of stainless steel for the required items of work.
 - a. Pipe: ASTM A 312, Grade TP 316
 - b. Sheet, Strip, Flat Bar and Plate: ASTM A 666, Type 316.
 - c. Tubing: ASTM A 554, Grade MT 316.
 - d. Castings: ASTM A 743A, Grade CF 8 or CF 20.
 - e. Bars and Shapes: ASTM A 276, Type 316.



- D. Exposed Steel (cold rolled)
 - 1. Structural Shapes and Sheets: ASTM A 1008.
 - 2. Strip: ASTM A109
- E. Steel (Carbon) for Concealed Supports Only
 - 1. Structural Shapes: ASTM A 36.
 - 2. Plates (for forming or bending cold): ASTM A 283, Grade C.
 - 3. Steel Sheets: ASTM A 366, Grade 1.
 - 4. Shop prime with rust inhibitive primer equal to Series 88 Azerox made by Tnemec, or similar product made by Benjamin Moore, Sherwin Williams or approved equal.
- F. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
- G. Fasteners: Furnish basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Provide Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- H. Anchors and Inserts: Either furnish inserts to be set in concrete or masonry work, or provide other anchoring devices as required for the installation of ornamental metal items. Provide toothed steel or lead shield expansion bolt devices for drilled-in-place anchors. Provide galvanized or cadmium-coated anchors and inserts for exterior installations.
 - 1. Provide units with exposed surfaces matching the texture and finish of the metal item anchored.
- I. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
- J. Cast-in-Place and Preinstalled Anchors: Anchors fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete.
- K. Sealants, Interior: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C834; of type and grade required to seal joints in decorative formed metal; and as recommended in writing by decorative formed metal manufacturer.
 - 1. Sealants must have a VOC content of not more than 250 g/l when calculated according to 40 CFR 59, Subpart D (EPA Method 24).



- L. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as recommended by produced of metal to be welded or brazed and as necessary for strength, corrosion resistance, and compatibility in fabricated items
 - 1. Use filler metals that will match the color of metal being joined and will not cause discoloration.

2.2 FABRICATION

- A. Cutting: Cut metal by sawing, shearing or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp, square and free of burrs, without deforming adjacent surfaces or metals.
- B. Holes: Drill or cleanly punch holes (do not burn), so that holes will be accurate, clean, neat and sharp without deforming adjacent surfaces or metals.
- C. Connections
 - 1. Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to water. Locate joints where indicated on drawings. Provide connections to allow for thermal movement of metal at locations and by methods approved by Commissioner. For work exposed to view, use concealed fasteners (unless welded or other connections indicated) with joints accurately fitted, flush and rigidly secured with hairline contacts.
 - 2. Welding: Welding must be in accordance with recommendations of the American Welding Society and must be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds must be continuous, except where spot welding is specifically permitted. Welds exposed to view must be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view must be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld splatter and welding oxides from all welded surfaces.
 - 3. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads, where shown to be exposed to view, must be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.
- D. Operating Mechanism: Operating devices, mechanism and hardware used in connection with this work must be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.



- E. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- F. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- G. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- H. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view must be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view must be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, must be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and must be of the smallest practicable size.
- I. Materials used must be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.
- J. Bending: Bend sheet metal to the required shape. Bent items must be free of grain separation, oil canning or other distortion.
 - 1. Square Bends: Back-cut sheets to attach maximum square bend possible, with maximum radius of 1/16 in.
 - 2. Knife Edge Bends: Back-cut and back bevel sheets to attain sharpest bend possible, with maximum radius of 1/32 in.

2.3 SHOP FINISHING

A. General

- 1. Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated.
- 2. Provide colors or color matches as indicated on selected samples.
- 3. Protect mechanical finishes on exposed surfaces from damage by application of strippable temporary protective covering prior to shipment.
- 4. Corrosion Protection: Coat concealed surfaces which will be in contact with concrete, masonry, wood or dissimilar metals, in exterior work and work to be



built into exterior and below grade walls and decks, with a heavy coat of bituminous paint. Do not extend coating onto exposed surfaces.

B. Aluminum

1. Class II Clear Anodized Finish: AA-M12C22A31, medium satin directional textured mechanical finish; inhibited chemical cleaning; 0.4 mil minimum thick anodic coating conforming to AAMA Spec. 607.1.

C. Stainless Steel

1. Remove or blend tool and die marks and stretch lines into finish.
2. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
3. Bright, Directional Polish: No. 4 finish unless otherwise noted.
4. When polishing is complete, passivate and rinse surfaces. Remove foreign matter and leave surface chemically dry.

2.4 PROTECTION

- A. Provide necessary protection to all exposed surfaces of architectural metal work, so as to prevent damage, staining, discoloration, abrasion, etc., to these surfaces from time of shipment from factory to acceptance of work of this project. Protection must be provided by wrappings, strippable coatings, or other means. After installation, remove protective paper or strippable coating and clean exposed surfaces, and then provide additional temporary protection to protect architectural metal work from damage during subsequent construction activities. Surfaces which are damaged, stained, discolored, abraded etc., must be rejected and replaced with new materials, at no cost to the City of New York.

2.5 STEEL FRAMING, BRACING, SUPPORTS AND REINFORCEMENTS

- A. Steel framing, plate reinforcing, supplementary steel framing or reinforcing, bracket assemblies, and the like required for the support, framing, reinforcing, bracing, etc., of work of this Section must be of such sizes and shapes as indicated on the drawings, or as required to suit the conditions, and must be provided with all necessary supports and accessory items such as inserts, hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly and rigidly fasten, anchor or attach work of this Section in place and to the concrete, masonry and other connecting and adjoining work.

2.6 ORNAMENTAL HANDRAILS AND RAILINGS

- A. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit,



or use fittings designed for this purpose. Weld connections continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
5. Form changes in direction of railing members by radius bends.
6. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of handrail and railing components.
7. Provide wall returns at ends of wall-mounted handrails, close ends of returns.
8. Close exposed ends of handrail and railing members with prefabricated end fittings.
9. Brackets, Flanges, Fittings, and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing members to other work, unless otherwise indicated.
 - a. Furnish inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.
 - b. For railing posts set in concrete, provide preset sleeves of steel, not less than 6 inches long and inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

2.7 STAINLESS STEEL COUNTERTOP WITH INTEGRAL SINK

- A. Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316, stretcher leveled, and No. 4 finish.
- B. Apply sound dampening to underside of metal work surfaces, including sinks and similar units. Provide coating with smooth surface and hold coating 1" back from open edges for cleaning.
- C. Counter Tops: Fabricate with reinforced tops to comply with referenced SMACNA standard, unless otherwise indicated, and as follows:



1. Tops: Minimum 0.0781" thick stainless steel, unless otherwise indicated.
 2. Top Reinforcement: Provide minimum 0.0781" thick, stainless steel reinforcing, unless otherwise indicated.
- D. Sinks: Fabricate of minimum 0.0781" thick stainless steel with fully welded, 1 piece construction. Construct 2 sides and bottom of sink compartment from 1 stainless steel sheet with ends welded integral and without overlapping joints or open spaces between compartments. Provide double wall partitions between compartments with 1/2" radius rounded tops that are welded integral with sink body. Cove horizontal, vertical, and interior corners with 3/4" radius. Pitch and crease sinks to waste for drainage without pooling. Seat wastes in die stamped depressions without solder, rivets, or welding.
1. Wastes: 2" nickel plated bronze, rotary handle waste assembly with stainless steel strainer plate and nickel plated brass, connected overflow.
- E. Fabricate assembly in accordance with NSF 2 "food zone" requirements. All welding must be accomplished using welding rod of same composition of metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits or cracks.

2.8 STAINLESS STEEL BOLLARDS

- A. Fixed stainless steel bollards:
1. Size: 12" nominal
 2. Height: 36"
 3. Bollard Material: Schedule 80, Type 316 Stainless Steel
 4. Finish: Bead Blasted Stainless Steel
 5. Cap Style: Standard Flat Top
 6. Mounting/Installation Method: Embedded
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Calpipe Security Bollards; SSF12080 or comparable product by one of the following:
1. Ameristar Security Products
 2. SecureUSA
 3. Or approved equal.

2.9 STAINLESS STEEL CORNER GUARDS

- A. Surface Mounted Stainless Steel Corner Guards:



1. Stainless steel 316 or 430 alloy, 16 gauge
 2. Wing Size: 3 1/2 inches.
 3. Angle: 90 or 135 degree corner as shown on Drawings
 4. Corner radius: 1/8 inch
 5. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.
 6. Height of Corner Guards: Full height and as indicated.
 7. Finish: No. 4 Brushed directional, satin finish, 320 grit or greater
 8. Secure with Torx pin head security screws at 12 inches on center
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties Inc.; C/S Acrovyn Surface Mounted Stainless Steel Corner Guards Model No. CO Series or comparable product by one of the following:
1. In-Pro Corporation (IPC)
 2. Pawling Corporation
 3. Or approved equal.
- C. Unless otherwise noted, provide 3.5" x 3.5" x 1/16" stainless steel angles.
- D. Set and adjust guards to finish flush with adjacent surfaces.

2.10 METAL-CLAD SIDEWALLS

- A. Laminate 0.0403" thick, metal sheets to outside face of stair sidewalls at locations indicated. Use adhesive recommended by metal fabricator that will fully bond metal to substrate and that will prevent telegraphing and oil canning.

2.11 ORNAMENTAL METAL ENCLOSURES

- A. General: Provide sheet metal selected for surface flatness, smoothness, and freedom from surface blemishes where exposed to view in the finished unit. Do not use materials with pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher leveled metal sheet, stains, discoloration, or other imperfections.
- B. Coordinate dimensions and attachment methods of sheet metal fabrications with those of adjoining products and construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned with one another in the relationship indicated.



- C. Increase metal thickness or reinforce metal with concealed stiffeners, backing materials, or both, as required to produce surfaces whose variations in flatness do not exceed those permitted by referenced standards for stretcher leveled metal sheet and to impart sufficient strength for indicated use.
 - 1. Support joints with concealed stiffeners as required to hold exposed faces of adjoining sheets in flush alignment.
 - 2. Fill space between stiffeners with sound deadening insulation attached to face sheet with cold applied asphalt mastic, unless otherwise indicated.
 - D. Assemble sheet metal fabrications in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
 - E. Form sheet metal fabrications to profiles indicated in maximum lengths to minimize joints and without exposed cut edges. Fold back exposed ends of unsupported sheet metal to form a 1/2" wide hem on the concealed side, or ease exposed edges with backing to a radius of approximately 1/32". Produce flat, flush surfaces without cracking or grain separation at bends.
 - F. Continuously weld joints and seams, except where other methods of joining are indicated. Grind, fill, and dress welds to produce smooth flush exposed surfaces in which welds are not visible after final finishing is completed.
 - G. Build in straps, plates, and brackets as required for supporting and anchoring fabricated items to adjoining construction. Reinforce sheet metal units as required to attach and support other construction.
 - H. Where noted, shop perforate enclosure following perforation pattern shown on drawings. Roll, press and grind perforated metal to flatten and to remove burrs and deformations.
 - I. Conceal fasteners unless otherwise noted on drawings. Size fasteners to support closures and trim, with fasteners spaced to prevent buckling or waviness in finished surfaces.
 - J. Miter or cope trim members at corners to form tight joints.
- 2.12 STAINLESS STEEL FRAMING
- A. Fabricate frames from stainless steel tubes to the sizes and shapes indicated. Miter and weld frame members at corners. Secure perforated plate in frames with fully continuous welds; all welds must be ground smooth and flush.



2.13 METAL PANELS

- A. Metal panels, fascias and other sheet or plate items must read as flat and free of bow or "oil canning" or "read thru" of stiffeners. To this end, exposed metal faces when supported in the building must be of such flatness that the maximum uniform bow in 2 ft. must not exceed 1/32", and the maximum overall variation in plane between high and low point within a panel must not exceed 1/16".

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. General: Install work of this Section square, plumb, straight, true to line or radius, accurately fitted and located, with flush, tight hairline joints (except as otherwise indicated or to allow for thermal movement), with provisions for other trades, with provisions to allow for thermal movement, with provisions to exclude water where exposed to weather, and with attachment devices as required for secure and rigid installation. It is the responsibility of the Contractor to ensure that shop fabricated architectural metal items will properly fit the field condition. In cases where the shop fabricated architectural metal items do not fit the field condition, the item must be returned to the shop for correction.
- B. Attachments
 - 1. Unless otherwise indicated, anchor work to be built into concrete or masonry with shop welded on galvanized steel strap anchors; anchor work to be attached to concrete or masonry by bolts into embedded inserts or expansion shields; anchor work attached to structural steel by welds or bolts; anchor work attached to metals other than structural steel by bolts or screws. Power actuated fasteners not permitted unless approved by Commissioner. Provide all supplementary parts necessary to complete each item of work of this Section.
 - 2. All attachment devices must be of type, size and spacing to suit condition and as approved by Commissioner. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view must be concealed, unless indicated otherwise. Where bolts or screws are permitted in work exposed to view, provide oval head and counter sunk, unless otherwise noted, with projecting end cut off flush with nuts or adjacent material, and match adjacent surfaces.
 - 3. Do all necessary drilling, tapping, cutting or other preparations of surrounding construction in the field accurately, neatly and as necessary for the attachment and support of work of this Section, but obtain Commissioner's approval prior to such preparation to work of others.



- C. Tolerances: All work of this Section must be plumb, square, level, true to radius and correctly aligned within the following limitations:
 - 1. Offset from true horizontal, vertical and design location must not exceed 1/16" per ten (10) feet of length for any component, not cumulative.
 - 2. Maximum offset from true alignment between abutting components must not exceed 1/32".
- D. All railings must be installed to withstand loads as required by 2008 New York City Building Code.
- E. Countertops must be installed to support a minimum concentrated live load of 150 lbs. acting downward at mid span at outer edge of counter without causing deformation and damage.
- F. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units at Contractor's option.
- G. Install concealed gaskets and joint fillers as the work progresses, so as to make the work soundproof or lightproof as required.
- H. Restore protective coverings which have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
- I. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
- J. Field Welding: Comply with AWS Code for the procedures of manual shielded metal-arc welding, the appearance and quality of welds made, and the methods used in correcting welding work.

3.3 CLEANING

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

END OF SECTION 05 70 00



**Department of
Design and
Construction**

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SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Blocking and miscellaneous wood, including plywood subflooring and wall lining for telephone and electric closets and stair sidewalls.
2. Rough hardware.
3. Plastic laminate countertops and vanities.
4. Installation only of finish hardware.
5. Installation only of doors and hollow metal frames.

B. Related Sections

1. Section 07 52 00 "Modified Bituminous Membrane Roofing"
2. Section 08 11 13 "Hollow Metal Doors and Frames"
3. Section 08 71 00 "Door Hardware"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.
- C. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with 2008 New York City Building Code and that treatment will not bleed through finished surfaces.
- D. Submit 12" x 12" samples of plastic laminate finish of thickness specified for countertops.



1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Lumber Standard: Comply with PS 20.
- C. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).
- D. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.
- E. Grade Marks: Identify lumber and plywood by official grade mark.
 - 1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
 - a. MC-15 or KD: Maximum of fifteen (15) percent moisture content.
- F. Installation of doors, frames and hardware must conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

1.5 PRODUCT HANDLING

- A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.
- B. Deliver rough hardware in sealed kegs and/or other containers which bear labels as to type and kind.
- C. Pile lumber for rough usage, when delivered to the site in stacks to ensure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.
- D. Do not store seasoned lumber in wet or damp portions of the building.
- E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
- F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.
- G. Hardware must be sorted and stored in space assigned by Contractor and kept at all times under lock and key. The safety and preservation of all items delivered is the responsibility of the Contractor.



1.6 JOB CONDITIONS

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Commissioner.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIAL

- A. General
 - 1. All wood must be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Do not use warped or twisted wood.
 - 2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, fire retardant treated as specified herein, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood must be S4S, S-Dry, complying with PS-20.
 - 3. For plastic laminate countertops or vanities provide 3/4" thick B-B EXT-APA plywood, fire retardant treated as specified herein, or "Duraflake FR" fire retardant composite board with hardwood edge, density of forty five (45) lbs./cubic foot, made by Willamette Industries, Inc., Hoover Treated Wood Products, Gulf Coast Lumber or approved equal.
 - 4. Plywood and rough carpentry for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.
- B. Wood Treatment
 - 1. All interior wood material specified herein must be fire retardant treated to comply with the AWWA standard U1 to achieve a flame spread rating of not more than 25 (UL Class "FR-S") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWWA Standard P49 and be free of halogens, sulfates and ammonium phosphate.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Arch Wood Protection Inc.; Dricon or comparable product by one of the following:
 - 1). Koppers



- 2). Hoover
 - 3). Or approved equal.
 - b. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to a moisture content of twelve (12) percent.
 - c. Provide UL approved identification on treated materials.
2. For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type B (CA-B); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative must comply with AWWPA Standard U1, (.25 lbs./cubic foot of chemical in wood).
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Arch Wood Protection Inc.; Wolmanized Natural Select or comparable product by one of the following:
 - 1). Koppers
 - 2). Hoover
 - 3). Or approved equal.
 - b. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent.
 3. Treated wood which is cut or otherwise damaged must be further treated in accordance with the AWWPA Standard M-4.

2.2 HARDWARE

- A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.
- B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
 1. Bolts: ASTM A 307, Grade A.
 2. Nuts: ASTM A 563.
 3. Lag Screws and Bolts: ASME B 18.2.1.
- D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.



2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2; use stainless steel for treated woods and exterior use.
- E. Wood Screws: ASME B 18.6.1.
- F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Commissioner.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 INSTALLATION OF FINISH HARDWARE

- A. Hardware must be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
- B. Unless otherwise noted, mount hardware units at heights established in Section 08 11 13 "Hollow Metal Doors and Frames".
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.



- G. All keys used must be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys must be returned to the City of New York.
- H. Adjusting and Cleaning
 - 1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
 - 2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.4 INSTALLATION OF DOORS AND FRAMES

A. Preparation

- 1. Remove welded-in shipping spreaders installed at factory.
- 2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- 3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

B. Installation

- 1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.



2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
 - b. At fire-protection-rated openings, install frames according to NFPA 80.
 - c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - d. Install frames with removable glazing stops located on secure side of opening.
 - e. Frames set in masonry walls must have door silencers installed in frames before grouting.
 - f. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - g. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements of Section 072100, "Thermal Insulation."
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 042000 "Unit Masonry" for installation of frames in masonry walls.
6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.



9. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
 10. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
 - a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 11. Glazing: Comply with installation requirements in Section 08 81 00 "Glass Glazing" and with standard steel door and frame manufacturer's written instructions.
 - a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.
- C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.
- 3.5 BLOCKING AND MISCELLANEOUS WOOD
- A. General
1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.
 2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.
 3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.
- B. Blocking and Miscellaneous Wood
1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers must be continuous wherever required, whether or not so indicated.
 2. Provide blocking as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., must be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.



3. Fastening for wood grounds, furring and blocking must be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings must be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.
2. Wood blocking must be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.
3. All nailing strips and blocking must be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.
4. Firmly secure all blocking and nailing strips in place using counter bored bolt and nut fastenings, or secure by any other proposed flush surfaced fastenings.
5. Furnish wood nailing strips or blocking required to be embedded in concrete work in time due for placing, prior to start of concrete operations. Locate and space nailing strips or blocking in coordination with the concrete trades, as required for respective installations.

3.6 TELEPHONE AND ELECTRIC EQUIPMENT MOUNTING BOARDS

- A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electric equipment rooms in accordance with the requirements of the local utility company.
- B. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels must be butted with 1/16" space between without lapping.

3.7 ROUGH HARDWARE

- A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.
- B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.



- C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.
- D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.
- E. For securing wood nailers to concrete, provide malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.
- F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
- G. Give detailed instructions with sketches of necessary requirements to the masonry trade showing the location and other details of such nailing devices.

3.8 CLEANING UP

- A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.
- B. Sweeping
 - 1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
 - 2. Remove the refuse to the area of the job site set aside for its storage.
 - 3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION 06 20 00



SECTION 06 61 16

SOLID SURFACING FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Millwork counters.
 - 2. Window sills.
 - 3. Shower wall panels.
- B. Related Sections
 - 1. Section 06 20 00 "Finish Carpentry"

1.3 REFERENCES

- A. ASTM D 256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- B. ASTM D 570 - Standard Test Method for Water Absorption.
- C. ASTM D 638 - Standard Test Method for Tensile Properties.
- D. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C. And 30 degrees C.
- E. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
- F. ASTM D 790 - Standard Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials.
- G. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
- H. ASTM G 22 - Standard Practice for Determining Resistance of Plastics to Bacteria.
- I. NEMA - National Electrical Manufacturers Association.



J. NSF - National Sanitation Foundation.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.
- C. Samples: Submit three (3) minimum 12" x 12" samples. Indicate full range of color and pattern variation. Samples must have outside corner/nosing/edging as shown on drawings and fully finished as if it were the final end-product. Approved samples will be retained as a standard for work.
- D. Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Applicable Standards: Standards of the following, as referenced herein:
 - 1. American National Standards Institute (ANSI).
 - 2. American Society for Testing and Materials (ASTM).
- C. Allowable Tolerances:
 - 1. Variation in Component Size: + 1/8".
 - 2. Location of Openings: + 1/8" from indicated location.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.7 WARRANTY

- A. Warranty: The manufacturer shall warrant to the City of New York that the manufacturer will, at own option, restore or replace without charge, such product if it fails due to a manufacturing defect during the first 10 years after substantial completion. This includes all labor charges needed to restore or replace the product covered hereunder.



PART 2 PRODUCTS

2.1 SOLID SURFACING MATERIAL COUNTERS AND SILLS

- A. Provide 1/2" thick solid surfacing material.
B. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124-1980, Type Six, and ISS FA-2.01 "Classification and Standards Publication of Solid Surfacing Material" as published by the International Solid Surface Fabricators Association (ISSFA).
1. Basis-of-Design Product: Subject to compliance with requirements, provide E.I. duPont de Nemours and Company; Corian "Mochera White" or comparable product by one of the following:
a. Porcelanosa.
b. Wilsonart.
c. Or approved equal.
C. Counters must be adhesively joined with no exposed seams, having edge details shown on drawings.
D. Material must conform to the published performance characteristics of ISSFA-2-01.
E. Performance Standards

Table with 3 columns: PROPERTY, REQUIREMENT, TEST PROCEDURE. Rows include Tensile Strength, Tensile Modulus, Elongation, Hardness, Gloss (60 degree), Color Stability, Wear and Clean, Flammability, Flame Spread, Smoke Developed Class, Water Absorption Weight (% Max.), Izod Impact, Impact Resistance Sheets, Boiling Water Surface.



Resistance
Stain Resistance

No visible change
Passes

NEMA LD3
ANSI Z124-1980
HUD Bulletin
UM-73-84

2.2 ACCESSORY PRODUCTS

- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.
- B. Adhesive: Manufacturer's standard neoprene-based adhesive meeting ANSI A146.1-1967 and UL listed.
- C. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in colors matching components.

2.3 FABRICATION

- A. Factory fabricate components exactly to sizes and shapes indicated, in accordance with approved shop drawings.
- B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints. No joints or seams will be permitted other than those shown on the approved shop drawings, unless specifically approved by the Commissioner.
- C. Provide factory cutouts for plumbing fittings and accessories as indicated on the drawings.
- D. Cut and finish component edges with clean, sharp returns. Route radii and contours to template.
- E. Provide all custom sizes, shapes, curves, configurations, reveals, and edgings as called for and shown on the drawings in the dimension and thicknesses noted.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and product installation data.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.



- C. All surfaces, other than those surfaces that are the mounting/gluing surfaces, must be fully polished to match the finished face of all components. Unfinished surfaces will be rejected.
- D. Final finished surfaces must be fully and evenly polished with manufacturer's recommended finishing products. Unfinished surfaces will be rejected.
- E. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Keep clean until Date of Substantial Completion. Replace stained components.
- F. Protect surfaces from damage until Date of Substantial Completion. Restore work or replace damaged work that cannot be restored to Commissioner's satisfaction.

END OF SECTION 06 61 16



**Department of
Design and
Construction**

FMS No. - SANDBOMB
Issue Date - 06/17/2022

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SECTION 07 13 00

FOUNDATION WATERPROOFING

PART 1 –GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes the following:

1. Installation of foundation waterproofing.
2. Handling and protection of foundation waterproofing.
3. Preparation of foundation waterproofing substrate.
4. Material requirements of foundation waterproofing.

- B. Related Sections

1. Section 31 00 00 – Earthwork for Preparation of foundation waterproofing substrate
2. Section 03 30 00 – Cast-in-Place Concrete for Material requirements of foundation waterproofing.

1.3 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, must be in accordance with the requirements of the Contract Documents. Contractor must examine all contract drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.
- B. Provide waterproofing in accordance with the requirements of the Contract Documents. Work of this section includes, but is not necessarily limited to, the following:
1. Below-grade foundation waterproofing of horizontal (floor slab, footings, pits) and vertical (foundation walls and pit walls) surfaces.
 2. Installation accessories including sealers, flashings, fasteners, tapes, reglets, liquid membranes, protection board or drainage mat, and similar accessories.



3. Installation of working surface for horizontal and vertical surfaces.
4. Installation of vertical foundation wall drainage panels.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide waterproofing that prevents the passage of water under hydrostatic pressure and/or water vapor and complies with requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current sheet membrane.

1.5 REFERENCES

- A. Latest editions of the American Society for Testing and Materials (ASTM) Standards:
 1. ASTM C836 – Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
 2. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 3. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
 4. ASTM D903 – Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
 5. ASTM D1876 – Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
 6. ASTM D3767 – Standard Practice for Rubber-Measurement of Dimensions.
 7. ASTM D5385 – Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
 8. ASTM E 96 – Water Vapor Transmission of Materials.
 9. ASTM E154 – Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- B. Final Geotechnical Engineering Study by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., dated 17 June 2019.

1.6 RELATED WORK

- A. Section 31 00 00 – Earthwork
- B. Section 03 30 00 – Cast-in-Place Concrete

1.7 SUBMITTAL PROCEDURES



- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit the following information for review by the Commissioner:
 - 1. Manufacturer’s product data, specifications, installation instructions, product samples.
 - 2. Laboratory test results demonstrating that the properties of the product meet or exceed the required values in Part 2.2 of this Section.
 - 3. Written certification that the Installer is certified by the manufacturer and has been actively installing the submitted membrane product (or similar product) for at least five years; and the names, addresses and contact names for three previous waterproofing projects completed by the installer (both supervisor and lead technician).
 - 4. Project-specific shop drawings containing:
 - a. Penetrations, curbs, drains, and projections.
 - b. Flashing details, including inside and outside corner reinforcement and terminations.
 - c. Typical installation details, showing details at intersection of horizontal and vertical surfaces and at penetrations in membrane system.
 - d. Crack and joint treatments, including expansion joints.
 - e. Interface with contiguous materials.
- C. Prior to commencing work, submit the following:
 - 1. Contractor’s Review: Before commencing work submit written statement signed by the Contractor and the Installer stating that the Contract Documents have been reviewed with a qualified representative of the Manufacturer of the waterproofing system, and that they are in agreement that the selected materials are proper, compatible with contiguous materials and adequate for the application shown. Indicate by transmittal form that a copy of the statement has been sent to the Manufacturer.
 - 2. Substrate Acceptability: Submit a certified statement issued by the Manufacturer of the waterproofing materials, and countersigned by the Installer, attesting that all areas and surfaces designated to receive waterproofing have been inspected and found satisfactory for the reception of the Work covered under this Section; and are not in conflict with the “Warranty” requirements. Installation of materials will be construed as acceptance of surfaces.
- D. Upon project closeout, submit the following:
 - 1. Statement of Supervision: Upon completion of Work submit a written statement signed by the Manufacturer stating that the field supervision by the Manufacturer’s representative



was sufficient to ensure proper application of the materials, that the Work was installed in accordance with the Contract Documents and that the installation is acceptable to the Manufacturer.

2. Warranty: Submit Manufacturer’s and Installer’s warranties upon acceptance of completed work, as described herein.

1.8 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Installer Qualifications: An entity meeting the requirements of DDC General Conditions Section 01 40 00 1.7/C/1 and that employs installers and supervisors who are trained and approved by the manufacturer.
- C. Single-Source Responsibility: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing waterproofing.
- D. Pre-installation Conference: Conduct conference at project site to comply with requirements of DDC General Conditions.
 1. Before installing waterproofing, meet with Commissioner, independent testing agency, waterproofing manufacturer, waterproofing subcontractor, and other concerned entities.
 2. Contractor must prepare job site mock-ups to demonstrate splices, corners, transitions, and establish quality control standards during conference.
 3. Review requirements for waterproofing, including surface preparation specified under other Sections waterproofing manufacturer’s requirements, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, inspection and testing procedures, and protection and corrections.
 4. Notify participants at least seven days before pre-installation conference.
- E. Manufacturer’s Representative/Contractor’s Certification:
 1. Representative of the waterproofing material manufacturer is required to provide field instructions and supervision for the installation of the waterproofing systems at the start of the work of this Section.
 2. The manufacturer’s representative is required to make sure that the workmen for waterproofing systems on the site of the Project are fully instructed in the handling and application of all the materials, and must see that all the materials are correctly installed.



3. Upon completion of the Installation, submit to the Commissioner written certification that the representative of the manufacturer of the waterproofing material has supervised the work of this Section and that all materials were correctly installed.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in original packaging with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.
- C. Liquid Materials, such as adhesives, thinners and primers, must be stored in areas away from sparks, open flames and excessive heat and cold.

1.10 PROJECT CONDITIONS

- A. Maintain adequate ventilation during preparation and application of waterproofing materials.
- B. Environmental Conditions: Apply waterproofing within range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1.11 WARRANTY

- A. Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
 1. Warranty Period: 2 years from date of Substantial Completion.
 2. Manufacturer to perform periodic site visit inspections to verify installation in accordance with Manufacturer's recommendations and requirements.

1.12 PROTECTION

- A. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work.
- B. Against Traffic: Do not permit traffic on horizontally installed work of this Section, except for workmen doing the work, during the installation, and after the installation until membrane systems are covered with protective boards or with the specified finishing materials.



- C. Against Damage: Protect vertically installed work of this section from damage by reinforcing and concrete placement.
 - 1. Take and maintain necessary preventative measures to protect work of this Section from damage until Project is accepted.
 - 2. Rejection of Damaged Work
 - a. Damaged materials or work will be rejected.
 - b. Rejected materials or work must be immediately removed and replaced with new materials.

PART 2 PRODUCTS

2.1 MEMBRANE MANUFACTURERS

- A. Provide below grade foundation waterproofing system of vertical foundation walls, horizontal slabs, pits, and footings subject to compliance with the requirements herein.
 - 1. Horizontal Applications, horizontal surfaces below slabs, and Sidewalks: “Preprufe 300R” from GCP Applied Technologies or equivalent from Carlisle Coatings & Waterproofing or equivalent from Henry or approved equal.
 - 2. Vertical Applications, “Negative (Blind) Side” Conditions: “Preprufe 160R” from GCP Applied Technologies or equivalent from Carlisle Coatings & Waterproofing or equivalent from Henry or approved equal.
 - 3. Vertical Applications, “Positive Side” Conditions: “Bituthene 4000” from GCP Applied Technologies or equivalent from Carlisle Coatings & Waterproofing or equivalent from Henry or approved equal.
 - 4. Waterproofing Protection: 1/4-inch thick semi-rigid protection board, Bituthene Asphaltic Hardboard from GCP Applied Technologies or equivalent from Carlisle Coatings & Waterproofing or equivalent from Henry or approved equal.
 - 5. Waterstop Applications: Adcor ES hydrophilic waterstop from GCP Applied Technologies or equivalent from Carlisle Coatings & Waterproofing or equivalent from Henry or approved equal.

2.2 MEMBRANE MATERIAL PHYSICAL PROPERTIES

- A. Provide “positive side” waterproofing complying with the following:

- 1. Tensile Strength, Film: 4,000 psi minimum; ASTMD412



2. Low-Temperature Flexibility: Unaffected at -10°F; MOAT 31:6D.
 3. Peel Adhesion to Concrete: 5 lbs/in; MOAT 27:5.1.3.
 4. Lap Adhesion: 2.5 lbs/in minimum; ASTM D1876, modified.
 5. Hydrostatic-Head Resistance: 231 feet; ASTM D5385, modified.
- B. Provide “negative side” waterproofing complying with the following:
1. Compressive Strength: 3,000 psi minimum; ASTM C109 modified
 2. Bond/Adhesion: 220 psi minimum; ASTM C321
 3. Hydrostatic-Head Resistance: 234 ft; ASTM D5385 Modified

2.3 PREFABRICATED DRAINAGE PANELS

- A. Prefabricated composite panels manufactured with geotextile facing laminated to molded plastic drainage core with ½-inch minimum sheet thickness and minimum flow rate of 10 gpm/min/foot.

2.4 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing sheet membrane.
- B. Furnish liquid-type auxiliary materials that meet the project’s VOC limits.
- C. Primer: Bituthene Liquid Primer recommended by manufacturer of sheet waterproofing material for substrate.
- D. Sheet Flashing: Self-adhering, rubberized asphalt composite sheet of same material, construction and thickness as waterproofing sheet membrane.
- E. Liquid Membrane: Elastomeric, 2 component, liquid, cold fluid applied, trowel grade or low viscosity, as recommended by waterproofing manufacturer for application.
- F. Patching Membrane: Low-viscosity, 2 component, asphalt modified coating.
- G. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended and supplied by waterproofing manufacturer.
- H. Penetration Seal: Self-adhering reinforced membrane, 2 ½ inches wide, with a tack free protective adhesive coating on one side and release film on self-adhering side.
- I. Metal Termination Bars: Aluminum bars, approximately 1 inch by 1/8 inch thick, predrilled at 22 mm centers.



- J. Waterproofing Protection: 1/4" thick semi-rigid protection board.
- K. Protection Board Adhesive: Protection board adhesive recommended by the manufacturer to secure protection board to waterproofing membrane.
- L. Joint Preprufe Tape: Pressure-sensitive, 4 inch wide, with a release film on adhesive side.
- M. Control Joint Preprufe Tape (Waterproofing Tape): Pressure-sensitive, 8 inch wide, with a release film on adhesive side.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Do not proceed with installation until after minimum concrete curing period recommended by waterproofing manufacturer.
- C. Verify substrate is visibly dry and free of moisture. Test for capillary moisture for plastic sheet method according to ASTM D4263.
- D. Notify Commissioner in writing of anticipated problems using waterproofing over substrate.
- E. Examine the areas and conditions where drainage system is to be installed and notify the Commissioner of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.

3.3 SUBGRADE SURFACE PREPARATION

- A. Clean, prepare, and treat working surface according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.
- C. Remove grease, oil, form release agents, and other penetrating contaminants.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids larger than 1/4-inch diameter.



- E. Prepare, fill, prime, and treat joints and cracks in substrate. Remove dust and dirt from joints and cracks according to ASTM D4258.
- F. Install membrane strip and center over construction and control joints and cracks exceeding a width of 1/16 inch.
- G. Inside Corners: Prepare, prime, and treat inside corners according to waterproofing manufacturer's written instructions.
- H. Install membrane strip centered over vertical inside corners. Install 19 mm fillets of liquid membrane on horizontal inside corners. All pile footing-to-wall intersections extend liquid membrane each direction from corner or install membrane strip centered over corner.
- I. Outside Corners: Prepare and treat outside corners according to waterproofing manufacturer's written instructions.
 - 1. Install strip of membrane 12 inches wide, centered over corner.
- J. Prepare, treat, and seal horizontal and vertical surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to waterproofing manufacturer's written instructions and approved shop drawings.
 - 1. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge and cover with sheet membrane strips.

3.4 SUBGRADE PREPARATION

- A. Install a minimum 3-inch thick concrete working "mud slab" beneath all building slabs, pits and foundations receiving waterproofing.
- B. Prepare surface of concrete working slab in accordance with paragraph 3.2 above.
- C. Place membrane waterproofing directly on top of concrete working slab, in accordance with paragraph 3.2 above.

3.5 PREPARATION FOR VERTICAL BLIND-SIDE APPLICATIONS

- A. Provide a continuous smooth rigid vertical facing to receive the waterproofing material per manufacturer's recommendations.
 - 1. The material for the elevator pits may consist of plywood or rigid insulation.
- B. Vertical facing to be sufficiently braced and supported so as not to displace during placement of concrete.
- C. Support of Excavation Systems must be treated with a rigid facing.



- D. Timber lagging must be close-butted to provide support and to be less than 0.5 inch out of plumb.

3.6 INSTALLATION OF WATERPROOFING FOR ACCESSIBLE WALLS

- A. General: Conform to recommendations and published specifications of the manufacturer including environmental requirements.
- B. Wall Applications: Refer to manufacturer's literature for complete installation instructions not limited to the following:
 - 1. General: The membrane, when in place, must withstand a minimum static ground water pressure of 150 feet.
 - 2. Priming: Application of primer must be limited to what can be covered with Bituthene Waterproofing Membrane in a given work day. Refer to manufacturers' recommendations for choice of primer and application procedure.
 - 3. Membrane Installation: Apply Bituthene Waterproofing Membrane vertically in sections of 8' in length or less. On higher walls apply two or more sections with the upper overlapping the lower by at least 2-1/2". Press all membrane in place with heavy hand pressure or rollers during application. Back-nail upper edge of membrane if necessary. Seal and cover fasteners with subsequent sheet.
- C. Sealing Edges: Bituthene Waterproofing Membrane must be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membranes are terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene Mastic to all vertical and horizontal terminations. Bituthene Liquid Membrane can be used as an alternative method at the Contractor's option. Refer to Contract Drawings for termination details.
- D. Sealing Seams: All edges and end seams must be overlapped at least 2-1/2". Apply succeeding sheets with a minimum 2-1/2" overlap and stagger end laps. Roll or press the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with Bituthene Membrane. Slit any fish mouths, overlap the flaps, and correct with a patch of Bituthene and press or roll in place. The edges of the patch must be sealed with a troweling of mastic. Laps within 12" of all corners must be sealed with a troweling of mastic.
- E. Corner Forming: Outside corners must be free of sharp edges. Inside corners must receive a fillet formed with Liquid Membrane. Do not use fiber or wood cants. One of two methods may be used for treating corners at the Contractor's option:
 - 1. Apply Bituthene Liquid Membrane 6" in each direction from the corner and form a fillet with a minimum 3/4" face.



2. Install an 11" minimum strip of Bituthene Membrane centered on the corner. Install Bituthene Membrane over the treated inside and outside corners.
- F. Over waterproofing, apply protection, and/or drainage composite board per contract documents by adhering board to cured membrane using tape or adhesive per manufacturer's recommendations.
- G. Seal penetrations through membrane to provide watertight seal with penetration seal patches or wrapping and liquid membrane fillet as recommended by the waterproofing system manufacturer.
- 3.7 **INSTALLATION OF WATERPROOFING FOR BLINDSIDE WALLS AND UNDERSLAB WATERPROOFING**
- A. General: Install waterproofing membrane sheet according to waterproofing manufacturer's written instructions.
- B. Wall Applications: Refer to manufacturer's literature for complete installation instructions not limited to the following:
1. Apply membrane in accordance with the manufacturer's recommendations to the soil retention system or adjacent foundation.
 2. Apply succeeding sheets by overlapping the previous sheet 3 inches along the uncoated edge of the membrane.
 3. Overlap the ends of the membrane 3 inches. Apply waterproofing tape centered over the end lap and roll firmly. Remove release liner.
 4. Concrete must be poured within 30 days of membrane application.
 5. Protect membrane until concrete pour.
 6. If membrane ties into a vertical membrane, leave an additional 12-inch flap of waterproofing membrane to tie into Bituthene membrane. Protect membrane from damage and direct sunlight.
- C. Underslab Applications: Refer to manufacturer's literature for complete installation instructions not limited to the following:
1. Apply membrane to the approved substrate 3-inch-minimum mud slab in accordance with the manufacturer's recommendations and approved shop drawings. Remove the release liner and fasten membrane to substrate firmly.
 2. Apply a Bituthene liquid membrane termination bead at the edge of the sheet membrane.
 3. Secure the sheet membrane and liquid membrane by applying waterproofing tape centered over the end lap and roll firmly. Remove the release liner.



4. Seal all penetrations and perimeter of installation.
5. Concrete must be poured within 30 days of membrane application.
6. Protect membrane until concrete pour.

3.8 SEAM REINFORCEMENT FOR PREPRUFE SHEETS ONLY

- A. Provide a 6-inch strip of waterproofing tape centered behind all laps.
- B. At locations where a salvage edge is not present and at end laps, lap sheets 6 inches, apply a 1/8-inch thick by 6-inch wide application of liquid membrane between sheets, to provide a 6-inch wide seal.
- C. Integration of old onto new pre-applied sheet membrane.
 1. Integration of Sheet Membrane onto Sheet Membrane that has been installed in excess of 30 days prior.
 - a. Lap sheets 12 inches and apply a 1/8-inch thick by 12-inch wide application of fluid membrane between sheets, to provide a 12-inch wide seal at this location.
 - b. Install waterproofing tape centered at edge of lap and roll firmly into place with an approved roller.
 - c. Install additional waterproofing tape to cover white film that has been installed over 30 days prior.
 2. Correction of pre-applied sheet membrane
 - a. Scratch on white coating exposing underlying black surfacing of Sheet Membrane: Install Waterproofing Tape at areas where the white coating of the membrane is damaged, including boot scuff marks and abrasions by rebar.
 - b. Damage or Puncture of Sheet Membrane: Install Patch of short Membrane set in Liquid Membrane. Patch must extend 3 inches in every direction around extent of damaged area. Install Waterproofing Tape centered over the edge of the patch. If the damaged area does not have 5 inches of sound material around it, inject Liquid Membrane into puncture until Liquid Membrane backs out, and proceed with patch as space allows.

3.9 WATER STOP INSTALLATION

- A. Provide hydrophilic waterstop at the locations of cold joints, namely interface of foundation walls and slabs, slabs and elevator pits.

3.10 PROTECTION AND CLEANING



- A. Pre-inspect membrane just prior to pouring slabs or installing second side of foundation wall forms.
- B. Protect waterproofing from damage and wear during application and remainder of construction period, especially during installation of steel reinforcement, according to manufacturer's written instructions.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- D. Horizontal Applications: Protect top surface of membrane with protection board from punctures, tears, or burns.
- E. Vertical Applications: Protect membrane waterproofing from damage due to uneven substrate. This includes placement of a rigid barrier such as a plywood or rigid insulation between the membrane waterproofing and the soil backfill material.

END OF SECTION 07 13 00



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SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Foundation insulation.
2. Rigid insulation.
3. Continuous fiberglass batt insulation.
4. Mineral wool insulation.
5. Attachment devices.

- B. Related Sections

1. Section 07 52 00 "Modified Bituminous Membrane Roofing" for roof insulation.
2. Section 07 84 13 "Penetration Firestopping"
3. Section 09 29 00 "Gypsum Board" for acoustical insulation.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit product data for each type of product indicated, including recycled content.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- C. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. The basis of design product listed below is a component of the design test assembly selected by the Commissioner.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 PRODUCTS

2.1 FOUNDATION WALL AND RIGID INSULATION

- A. Provide extruded polystyrene board insulation equal to "Styrofoam" manufactured by Dow Chemical Co., or approved equal made by Owens Corning or PACTIV Building Products or approved equal, conforming to ASTM C 578, Type IV, with a maximum flame spread and smoke developed indices of 75 and 450 respectively.
- B. Insulation must have an aged R value of not less than 5/inch; 2" thick unless otherwise noted on the drawings.

2.2 FIBERGLASS BATT INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation.



2. Johns Manville.
 3. Knauf Insulation.
 4. Owens Corning.
 5. Or approved equal
- B. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim Kraft, or foil-scrim polyethylene.
1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.3 MINERAL-WOOL BOARD INSULATION

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Roxul; Comfortboard 110 or comparable product by one of the following:
1. Johns Manville
 2. Rockwool
 3. Or approved equal
- B. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Nominal density of 11 lb/cu. ft., Type IVB, thermal resistivity of 4.35 deg F x h x sq. ft./Btu x in. at 75 deg F.
 2. Fiber Color: Darkened, where indicated.

2.4 ACCESSORIES

- A. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.
1. For bonding rigid polystyrene insulation to masonry or concrete, provide adhesive equal to "Foamgrab PS" made by Dacor Products Co. or equal made by ChemRex Inc., Miracle Adhesives or approved equal.
- B. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.



2.5 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
 - 1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
 - 1. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
 - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
 - 1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 2 inches between face of insulation and substrate to which anchor is attached.
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSPECTION

- A. Examine the areas and conditions where thermal insulation is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 INSTALLATION, GENERAL

- A. Clean substrates of substances that are harmful to insulation including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.
- B. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. If not otherwise indicated, extend insulation a minimum of 36 inches in from exterior walls.

3.5 INSTALLATION OF BLANKET INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.



- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 5. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
 6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
 - a. Exterior Walls: Set units with facing placed toward interior of construction as indicated on Drawings.

3.6 INSTALLATION OF SEMI-RIGID INSULATION FOR FRAMED CONSTRUCTION

- A. Install wall insulation with edges closely butted, with joints square, straight and in alignment (no staggered), and with vapor barrier facing on warm side of building, and with exposed faces flush and in the same plane without warp or twist. Cut and fit insulation to closely fit intersecting or penetrating surfaces. Seal joints between insulation, between insulation and intersecting or penetrating surfaces and between insulation and perimeter surfaces with 4" wide vaporproof aluminum tape applied on the vapor barrier side. Friction fit insulation between furring channels or studs.

3.7 INSTALLATION OF BOARD INSULATION FOR CONCRETE SUBSTRATES

- A. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:



1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.8 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00



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SECTION 07 27 00

AIR BARRIERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Vapor retarder/air barrier applied over sheathing board and cold formed metal framing.
2. Materials and installation to bridge and seal the following air leakage pathways and gaps:
 - a. Connections of the walls to the roof.
 - b. Connections of the walls to the foundations.
 - c. Seismic and expansion joints.
 - d. Openings and penetrations of window frames, storefront, curtain wall.
 - e. Door frames.
 - f. Piping, conduit, duct and similar penetrations.
 - g. Masonry ties, screws, bolts and similar penetrations.
 - h. All other air leakage pathways in the building envelope.

B. Related Sections

1. Section 05 40 00 "Cold Formed Metal Framing" for exterior non-load bearing wall frame construction, including sheathing.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide air/vapor barrier constructed to perform as a continuous air/vapor barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane must accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
- B. Provide an air barrier assembly that has been tested in accordance with the Air Barrier Association of America's (ABAA's) approved testing protocol to provide air leakage results not to exceed:
1. 0.01 cfm/sf @ 1.57 psf



- C. Connections to Adjacent Materials: Provide connections to adjacent materials at the following locations and show same on shop drawings:
1. Foundation and walls, including penetrations, ties and anchors.
 2. Walls, windows, curtain walls, storefronts, louvers or doors.
 3. Different wall assemblies, and fixed openings within those assemblies.
 4. Wall and roof connections.
 5. Floors over unconditioned space.
 6. Walls, floor and roof across construction, control and expansion joints.
 7. Walls, floors and roof to utility, pipe and duct penetrations.
 8. Seismic and expansion joints.
 9. All other leakage pathways in the building envelope.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit shop drawings showing locations and extent of air/vapor barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
- C. Submit manufacturer's product data sheets for each type of membrane, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
- D. Submit manufacturer's data showing solids content of fluid applied membranes and coverage rates and wet film thickness upon application in order to achieve minimum dry film thickness required by this specification.
- E. Submit manufacturer's installation instructions.
- F. Submit certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it, including sealant as specified in Section 054000 for caulking joints between sheathing panels.
- G. Submit samples, 3 by 4 inch minimum size, of each air/vapor barrier material required for Project.
- H. Test results of air permeability testing of primary air barrier material (ASTM E 2178-01)



- I. Test results of assembly in accordance with ASTM E 2357.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Single-Source Responsibility: Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Field-Constructed Mock-Ups: Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution:
 - 1. Construct typical exterior wall panel, 8 feet long by 8 feet wide and one of sheathed areas, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing, building corner condition, and typical penetrations and gaps; illustrating materials interface and seals.
- D. Test mock-up in accordance with ASTM E 783 and ASTM E1105 for air and water infiltration.
- E. Manufacturer must be on-site at least once a week to observe installation and provide written report within 3 days.
- F. Manufacturer must confirm all termination details and compatibility with materials being terminated to.
- G. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be evaluated as part of this specific assembly test. The basis of design product listed in Part 2 is a component of the design test assembly selected by the Commissioner.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor barrier manufacturer. Protect stored materials from direct sunlight.
- C. Avoid spillage. Immediately notify Commissioner if spillage occurs and start clean up procedures.
- D. Clean spills and leave area as it was prior to spill.



1.7 WARRANTY

- A. System Warranty: Provide the manufacturer's three (3) year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Liquid Membrane: Vapor Permeable Fluid-Applied Membrane.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Air-Bloc 31 Vapor Permeable Fluid-Applied Membrane or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- B. Sheet Transition Membrane
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Blueskin SA or Blueskin VP 160 or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- C. Window and Door Opening Flashing
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Blueskin SA or Metal Clad or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- D. Liquid Applied Flashing
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Air-Bloc LF or comparable product by one of the following:
 - a. GCP Applied Technologies.



- b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- E. Through-Wall Flashing
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Blueskin TWF or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- F. Primer for Sheet Transition Membrane and Flashing
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; Blueskin LVC Adhesive or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.
- G. Air Barrier Sealant
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry Company; HE 925 BES Sealant or comparable product by one of the following:
 - a. GCP Applied Technologies.
 - b. Carlisle.
 - c. Sika.
 - d. Or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where the above grade waterproof membrane is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.



3.3 SURFACE PREPARATION

- A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.
- B. Cracks in masonry and concrete up to 1/4" wide must be filled with a trowel application of liquid membrane and allowed to cure overnight prior to application of the liquid membrane to the surface, or alternatively, the cracks may be sealed with a strip of transition membrane applied to the substrate. Cracks wider than 1/4" should be sealed with transition membrane adhered to the substrate lapped a minimum of 3" on both sides of the crack.
- C. Surfaces should be tied in with beams, columns, window and door frames, etc. using strips of transition membrane lapped a minimum of 3" on both substrates. Mechanical attachment should be made to all window and door frames, or a properly designed sealant joint provided.

3.4 TRANSITION MEMBRANE

- A. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 3" overlap at all ends and side laps.
- B. Tie-in to window frames, metal door frames, etc., and at the interface of dissimilar materials as indicated on the Drawings.
- C. Promptly roll all laps and membrane with a counter top roller to effect seal.
- D. Ensure all preparatory work is complete prior to applying liquid membrane.

3.5 THROUGH-WALL FLASHING MEMBRANE

- A. Align and position the leading edge of self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or shelf angles, partially remove protective film and roll membrane over surface and up vertically.
- B. Press firmly into place. Ensure minimum 50mm overlap at all end and side laps.
- C. Promptly roll all laps and membrane to effect the seal.
- D. Ensure all preparatory work is complete prior to applying self-adhering through-wall flashing membrane.
- E. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the Commissioner.
- F. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane must form continuous flashing and must extend up a minimum of 4-1/2" up the back-up wall.
- G. When flashing at window openings, wrap the entire window opening with air barrier flashing membrane.



3.6 LIQUID MEMBRANE APPLICATION

- A. Apply liquid membrane to wall substrates in a continuous coat at manufacturer's recommended rate by spray or trowel to provide a minimum wet film thickness of 0.093".
 - 1. Minimum dry film thickness must be 0.078".
- B. Overlap liquid membrane on to transition membrane at connections a minimum of 1".
- C. Trowel liquid membrane around ties and other projections to ensure a complete seal.
- D. Do not leave membrane exposed for any longer than 6 weeks.
- E. Penetrations: Seal all penetrations with termination mastic liquid membrane, sealant, flashing or other procedures in accordance with manufacturer's instructions.

3.7 PROTECTING AND CLEANING

- A. Protect air/vapor barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Protect air/vapor barrier from exposure to the elements as required by the manufacturer.
- D. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer.
 - 1. Schedule work to ensure that the air and vapor barrier system is covered as soon as possible after installation. Protect air and vapor barrier system from damage during subsequent operations. If the air and vapor barrier system cannot be permanently covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

3.8 FIELD TESTING

- A. Contractor must hire testing laboratory to confirm that the system has been tested and passed requirements in accordance ASTM E 783 and ASTM E 1105 for air and water infiltration. Submit test results to Commissioner.

END OF SECTION 07 27 00



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SECTION 07 42 13

METAL WALL PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Custom solid aluminum façade panels with factory-applied finish.
2. Perforated aluminum façade panels with factory-applied finish.
3. Sub-girts, trim, and accessories required for complete installation.
4. Aluminum copings, heads and sills in conjunction with metal wall panel assembly.
5. Sealant in conjunction with metal wall panels work.

- B. Related Sections

1. Section 05 40 00 "Cold Formed Metal Framing"

1.3 PERFORMANCE CRITERIA

- A. Engineering Services: Engineer calculations, signed and sealed by a Professional Engineer licensed in the State of New York, must be submitted to verify load carrying capability of panel system. Panel system must be capable of resisting a minimum positive and negative wind load as specified in structural documents, with a deflection of L/180.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Manufacturer's Data: Submit standard detail drawings and installation instructions for preformed metal siding. Include manufacturer's certification or other data substantiating that the materials and finishes comply with the requirements.
- C. Samples: Submit twelve (12) inch long by full width samples of preformed metal siding, complete with factory applied finish. Samples will be reviewed by Commissioner for pattern, texture and color only. Compliance with other requirements is the exclusive responsibility of the Contractor.



- D. Shop Drawings: Submit shop drawings showing the profiles of preformed metal siding units, and the details of forming, jointing (gaskets, if any), internal supports, anchorages, trim, flashing, and accessories. Show details of weatherproofing at edges, terminations, and penetrations of the metal siding work. Show small scale layout and elevations of entire work.
- E. Engineering Data: Submit engineering and test data and tables showing performance characteristics of the panels for loads, deflections and infiltration of air and water meeting standards specified herein.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Installer Qualifications: An entity meeting the requirements of DDC General Conditions Section 014000 1.7/C/1.
- C. Manufacturer Qualifications: Manufacturer meeting the requirements in DDC General Conditions Section 014000 1.7/C/5.

1.6 WARRANTY

- A. Exterior panel finish must be warranted against failures of any kind for a period of ten (10) years from date of Substantial Completion.
- B. Wall system must be warranted against failures of any kind for a period of five (5) years from date of Substantial Completion.

1.7 COORDINATION

- A. Contractor must carefully coordinate work with work of other trades that are penetrating through, or connecting to the metal siding. Openings required in siding to accommodate penetrations must be neatly and accurately made in the shop prior to job site delivery.
- B. Provide concealed reinforcing plates, anchors and supports to receive items mounted on siding as required to prevent deflection of siding.
- C. Provide all necessary trim, flashing, sealant as specified herein to ensure watertight integrity of siding where penetrations occur.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide MetalTech-USA; product listed in Part 2 or comparable product by one of the following:
 - 1. Pohl
 - 2. Protean



3. Or approved equal.
 - B. Provide perforated metal as indicated on drawings.
 - C. Provide solid metal as indicated on drawings.
- 2.2 MATERIALS
- A. Panels: ASTM B209, Type 5005.
 - B. Flat Panels: 6 and 13 inch, .063 inch
 1. 5005 aluminum, 0.063" thickness., clear coat
 2. Concealed fasteners.
 3. Panel width: 18", panel depth: 1".
 4. Bending outside radius: 3/32"
 5. Finish: clear coating: 3-part PVDF Coating, Base of Design: Kynar 500, Valspar, Hylar or approved equal
 6. Basis-of-Design Product: Subject to compliance with requirements, provide MetalTech-USA; Interlocking Reveal Panel or comparable product by one of the following:
 - a. Pohl
 - b. Protean
 - c. Or approved equal.
 - C. Accordion Fold Rainscreen: 0.08 inch
 1. 5005 aluminum, 0.08" thickness,
 2. Concealed fasteners,
 3. Panel width: varies, panel depth: varies.
 4. Perforations as per drawings.
 5. Bending outside radius: 1/8"
 6. Finish: clear coating: 3-part PVDF Coating, Basis-of-Design: Kynar 500, Valspar, Hylar or approved equal
 7. Parapet and Soffit Caps as per drawings and to match the panels in material, thickness and finish.
 8. Basis-of-Design Product: Subject to compliance with requirements, provide MetalTech-USA; Custom Super-Reveal Panel or comparable product by one of the following:



- a. Pohl
 - b. Protean
 - c. Or approved equal.
- D. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.
1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- E. Trim Material: Furnish necessary trim in conjunction with the metal wall system, including top, bottom, corner, end wall jamb, sill, and head. Provide material that is the same substrate, finish, and gauge as the exterior panel. Provide preformed panel corners.
- F. Sealant: One part silicone conforming to the requirements of Section 079200, "Joint Sealers."
- G. Rainscreen Ventilation Strips - Basis-of-Design Product: Subject to compliance with requirements, provide Cor-A-Vent Inc.; Coravent SV-5 or comparable product by one of the following:
1. Delta Fassade
 2. InvAir
 3. Or approved equal.
- H. Vapor-Permeable, Non-Bituminous, Air Barrier Sheet
1. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 2. Water Vapor Permeance: 42 perms; ASTM E 96, Method B.
 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 4. Color: Black.
 5. Basis-of-Design Product: Subject to compliance with requirements, provide VaproShield LLC; RevealShield IT or comparable product by one of the following:
 - a. Henry Company
 - b. GCP Applied Technologies, Inc.
 - c. Or approved equal.



2.3 WALL SUPPORT FRAMING SYSTEM

A. Thermally Broken Rain Screen Attachment System

1. Attachment clip: 4" depth clip.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Spring Valley Corp; i-Clad Thermal Insulator "i-Clad H-100" or comparable product by one of the following:
 - 1). Cascadia
 - 2). NVELOPE
 - 3). Or approved equal.
2. Horizontal Z-girts: Min. 18-gauge thickness cold-formed steel.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Spring Valley Corp; i-Clad Horizontal Rail or comparable product by one of the following:
 - 1). Cascadia
 - 2). NVELOPE
 - 3). Or approved equal.
3. Gauge, Configuration, Dimensions, and Spacing: Minimum 18-gauge and as needed to conform to design criteria for each assembly.
4. Material: ASTM A635M, Coating Designation Z100 min.

B. Wall Brackets:

1. Minimum 0.046-inch-thick (18-gauge) sheet steel.
2. Pre-Punched Holes: For minimum two wall anchors per bracket.
3. Dimensions: As needed to offset cladding from wall plane where meeting substrate and to allow for installation of insulation equal in thickness to offset.
4. Bracket Base Dimension – Minimum 3.25-inch-high and 2.125 inch-wide
5. Offset Brackets – 3, 4, 5 or 6-inch depth.
6. Basis-of-Design Product: Subject to compliance with requirements, provide Spring Valley Corp; i-CLAD Substructure or comparable product by one of the following:
 - a. Cascadia
 - b. NVELOPE
 - c. Or approved equal.

C. Vertical or Horizontal Rail:

1. Minimum 0.046-inch thick (18 gauge) cold-formed steel.



2. Basis-of-Design Product: Subject to compliance with requirements, provide Spring Valley Corp; i-CLAD Vertical or Horizontal Rail or comparable product by one of the following:
 - a. Cascadia
 - b. NVELOPE
 - c. Or approved equal.

- D. Rain Screen Components Thermal Isolation:
 1. Insulation Material: Injection molded Polypropylene Impact Copolymer non-fiber reinforced
 2. Tensile Modulus: 182.75 per ISO 527-2/1
 3. Melting Temperature: 318 degrees Fahrenheit per ISO 3146
 4. Rockwell Hardness: 88 as per ASTM D785
 5. Size: as per details
 6. Basis-of-Design Product: Subject to compliance with requirements, provide Spring Valley Corp; i-CLAD Thermal Insulator or comparable product by one of the following:
 - a. Cascadia
 - b. NVELOPE
 - c. Or approved equal.

- E. Connectors and Anchors:
 1. For steel stud framing substrate: Self-drill hex-washer-head stainless steel with 1,000-hour salt-spray rated thermoset polyester coating.
 2. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
 3. Minimum ultimate pull-out capacity from 18-gauge steel: 450 pounds
 4. For concrete and concrete masonry unit substrate:
 5. Embedment depth: 1 inch minimum for concrete masonry 1.75" for poured concrete
 6. Minimum ultimate pull-out capacity from substrate material: 450 pounds
 7. 1/4" fasteners recommended by system manufacturer.
 8. 1/4" diameter self-drilling screws with required pull-out strength.



9. For horizontal rail to vertical rail connection: Self-drill hex-washer-head stainless steel with 1,000-hour salt-spray rated thermoset polyester coating.
 10. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
 11. Minimum ultimate pull-out capacity from 18-gauge steel: 450 pounds
- F. Provide nylon washers on both sides of the aluminum panels.
- G. Connectors or Anchors for clips, girts and panels Gauge, Configuration, Dimensions, and Spacing: Minimum gauge and as required to conform to design criteria for each assembly.
1. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals. Coordinate between aluminum and stainless steel materials.

2.4 FABRICATION

- A. Comply with dimensions, profile limitations, gauges and fabrication details shown and specified.
- B. Fabricate components of the system at factory, ready for field assembly.
- C. Fabricate components and assemble units to comply with performance requirements specified.
- D. Apply specified finishes in conformance with manufacturer's standards, and according to coating manufacturer's instructions.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. General: Comply with panel manufacturer's instructions for assembly, installation and erection of metal wall panels.
- B. Metal Separation: Apply a coat of bituminous paint, concealed, on both surfaces wherever dissimilar metals would otherwise be in contact. Use gasket fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.
- C. Anchor sub-girts to stud back-up, spacing sub-girts not to exceed 16" o.c. unless closer spacing required to meet deflection criteria. Use stainless steel anchors to fasten sub-girts to stud framing; space anchors 8" o.c. at each stud.



- D. Erect panels plumb, level and true to line with tolerances not exceeding 1/16" in runs of 20' and within 1/16" of adjoining faces.
- E. Fasteners: Exposed, self sealing type in and ordered manner. Finish fastener to match wall panel.
- F. Joint Sealers: Install gaskets, joint fillers and sealants where required for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers recommended by panel manufacturer.
- G. Damaged Material: Remove and replace panels and component parts of the work which have been damaged (including finish) beyond successful restoration, as directed by the Commissioner. Restore materials and finishes with minor damage.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces (exterior and interior) of metal wall panels work promptly after completion of installation. Comply with recommendations of both the panel and coating manufacturer.
- B. Protection: The Installer of metal wall panels must advise the Contractor in writing of protection and surveillance procedures which can be foreseen as needed to ensure that the work will be without damage or deterioration at the time of final acceptance after completion of other construction work.

END OF SECTION 07 42 13



SECTION 07 52 00

MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. SBS modified bitumen roofing, five-ply system.
2. Roof insulation.
3. SBS modified flashing.
4. Accessories, including walkway pads.
5. Temporary roofing.

- B. Related Sections

1. Section 06 20 00 "Finish Carpentry" for wood blocking.
2. Section 07 62 00 "Sheet Metal Flashing and Trim" for flashing and sheet metal.
3. Section 22 14 23 "Storm Drainage Piping Specialties" for roof drains.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.
1. For asphalt bitumen, provide label on each container or certification with each load of bulk bitumen, indicating flash point (FP), finished blowing temperature (FBT), softening point (SP) and equiviscous temperature (EVT).
- C. Pre-Roofing Conference: Submit copies of pre-roofing conference records.



1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Installer Qualifications: An entity meeting the requirements in DDC General Conditions Section 014000 1.7/C/3.
- C. Obtain primary roofing products, including roofing sheets (felts), bitumen, composition flashings, and vapor barrier from a single manufacturer. Provide secondary materials as recommended by manufacturer of primary materials.
- D. Pre-Roofing Conference: Prior to installation of roofing and associated work, meet at project site, or other mutually agreed location, with Installer, roofing manufacturer, installers of related work, Contractor and other entities concerned with roofing performance, including the Commissioner and City of New York. Record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours advance notice to participants prior to convening pre-roofing conference. Review methods and procedures related to roofing work, including but not limited to the following:
 - 1. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
 - 2. Review roofing system requirements (drawings, specifications and other Contract Documents.
 - 3. Review required submittals, both completed and yet to be completed.
 - 4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 5. Review required inspection, testing, certifying and material usage accounting procedures.
 - 6. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
- E. UL Listing: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown.
 - 1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package or container indicating that materials have been produced under UL's Classification and follow-up Service.
- F. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated



below, by UL or other testing and inspecting agency acceptable to the City of New York:

1. Surface Burning Characteristics: ASTM E 84.
 2. Fire Resistance Rating: ASTM E 119.
 3. Combustibility Characteristics: ASTM E 136.
- G. Provide roofing system and component materials which have been evaluated by Factory Mutual System for fire spread, wind-uplift Class 90, and hail damage and are listed in "Factory Mutual Approval Guide" for Class I construction. System must also meet ASCE-7 for wind uplift standards.
1. Provide roof covering materials bearing FM approval marking on bundle, package or container, indicating that material has been subjected to FM's examination and follow-up inspection service.

1.5 JOB CONDITIONS

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

1.6 PRODUCT HANDLING

- A. Store and handle roofing sheets in a manner which will ensure that there is no possibility of significant moisture pick-up.
- B. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

1.7 WARRANTY/GUARANTEE

- A. Special Project Warranty: Provide written warranty, signed by Manufacturer of primary roofing materials, agreeing to restore or replace defective materials and workmanship as required to maintain roofing system in watertight condition.
- B. Warranty period for manufacturer is twenty (20) years after date of Substantial Completion; no dollar limit.
- C. Guarantee period for installer is two (2) years after date of Substantial Completion; no dollar limit.



PART 2 PRODUCTS

2.1 ROOFING SYSTEM

- A. SBS-modified bituminous sheet roofing five-ply, including vapor retarder. Provide hot-asphalt applied roofing system with a solid white reflective mineral-surfaced (cool roof), SBS-modified bituminous cap sheet.
- B. Primer: Asphalt cut-back primer, complying with ASTM D 41.
- C. Bitumen: Roofing asphalt complying with ASTM D 312, type as recommended by roofing manufacturer.
- D. Basis-of-Design Product: Subject to compliance with requirements, provide Johns Manville; 4CID CR or comparable product by one of the following:
 - 1. Firestone
 - 2. GAF
 - 3. Siplast
 - 4. Soprema
 - 5. Or approved equal.

2.2 ROOF INSULATION

- A. Polyisocyanurate Board Roof Insulation: Rigid, sloped (1/4" per foot) and flat, cellular thermal insulation with polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides; complying with ASTM C1289, average LTTR value as designated at mean temperatures indicated, after testing per ASTM C1303 as follows:
 - 1. Surface Burning Characteristics: Maximum flame spread of 25.
 - 2. LTTR R-Value: 7.2/inch at 75 deg. F.
 - 3. Roof membrane manufacturer must approve insulation in writing.
 - 4. Basis-of-Design Product: Subject to compliance with requirements, provide Johns Manville; E'NRGY' 3 ISO or comparable product by one of the following:
 - a. Apache
 - b. GAF
 - c. Or approved equal.
- B. Cover insulation with 3/4" thick protection board recommended by roofing manufacturer.



2.3 MODIFIED BITUMINOUS BASE FLASHING

- A. Provide modified bituminous base flashing system as determined by edge details and that is acceptable to roofing manufacturer.

2.4 CANT STRIPS

- A. Provide cant strips formed of rigid insulation matching roof insulation or molded asphalt or coal tar impregnated organic fiber insulation material, 45° cant, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Flashing at penetrations: PMMA liquid type as part of manufacturers system.
- B. Lead flashing sheet of 4 lb. flashing lead for pipe flashing of common desilverized pig lead.
- C. FM approved mechanical fasteners for attaching insulation to cement deck.
- D. Walkway Pads: 3/8" thick, 32" x 32" skid resistant modified asphalt with ceramic granular surface on both sides.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Johns Manville; Dyna Tred Plus roof pads or comparable product by one of the following:
 - a. Firestone
 - b. GAF
 - c. Siplast
 - d. Soprema
 - e. Or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION, GENERAL

- A. Install roofing in accordance with manufacturer's recommendations and requirements of the New York City Building Code.
- B. Provide clean, smooth and dry substrate, free of projections which might puncture the felts.
- C. Ensure that all drains, curbs, blocking and roof penetrating components are in place before any roofing work starts. See that all roof drains are set 1" below the normal



finish roof level to ensure that additional flashing around the drains will not be built-up above the normal roof level and prevent proper drainage.

- D. Provide a visible thermometer and thermostatic controls on all kettles. Discard any bitumen not heated in accordance with manufacturer's recommendations.
- E. Provide a tarpaulin covering the wall below the bucket hoist to prevent staining of the wall with spilled bitumen.
- F. Provide protection of coping, cant strips and other building components adjacent to the roof deck unloading area.
- G. Ensure good adhesion between substrate and members when temperature drops below 40 deg. F. Provide the following precautions:
 - 1. No overheating of bitumen to compensate for rapid chilling is permitted.
 - 2. Insulate buckets to carry hot bitumen.
 - 3. Manual mopping no farther than 5 ft. in front of the felt rolls, and immediate unrolling of felts.
 - 4. Immediate application of top pour and aggregate, before stored heat in the membrane dissipates.
 - 5. Below 32 deg. F., store felts in a warm enclosure or pre-heat felts before application.
- H. Install flashing, including counter flashing, as roof application progresses. If delay is unavoidable, trowel the top of the flashing with flashing cement close to the joint to prevent water from entering behind the flashing until the counter flashing is in place.
- I. Start roofing application at far points of the deck and work toward area where base materials are fastened to the roof deck (to minimize traffic over newly applied roofing).
- J. Weigh down all membrane edges left incomplete before splicing with other sections of membrane.
- K. Provide enveloping of perimeter felts to prevent bitumen drippage.
- L. Prohibit phased application in which saturated felts are left exposed overnight or longer before top plies and topcoat are applied. Place aggregate surface on same day as felts.
- M. Inspect roof drains for obstructions and debris after the roofing work is completed.
- N. Prime deck as recommended by roof membrane manufacturer.

3.3 INSULATION

- A. Extend insulation and Perlite board full thickness over entire surface to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation and mastic.



- B. Apply a double layer of insulation of the required thickness, to make up the total thickness. Stagger joints between layers as recommended by the manufacturer.
- C. Set first layer of insulation using adhered using adhesive approved by manufacturer in accordance with FM requirements to meet I-90 wind uplift. Apply second layer of insulation and Perlite board in steep asphalt.
- D. Do not advance the laying of insulation ahead of roofing more than necessary for sequence of operations. Cover insulation exposed at end of each day's work (and when rain threatens) with waterproofing materials. Do not permit insulation to become wet. Remove and dispose of insulation which has become wet; replace before proceeding with roofing work.
- E. Lay with edges in moderate contact but do not force into place.
- F. Stagger end joints; or tape joints where recommended by the manufacturer.
- G. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.

3.4 ROOFING

- A. Do not apply hot bitumen under any condition that would cause foaming. Test substrate for excessive moisture by pouring one pit of steep asphalt at 400 deg. F. on the deck, at the start of each day's work, and at the start of each roof area or place. Substrate is too wet if test sample foams or can be easily (cleanly) stripped after cooling.
- B. Bitumen Heating: Do not raise the temperature above the min. normal fluid-holding temperature more than one hour prior to time of application. Discard bitumen which has been held at an elevated temperature (as required for application) for a period exceeding 3 hrs. Do not heat bitumen above the temperature required to ensure that the application viscosity results in adequate mopping weight and maximum adhesion to substrates. Determine the flash point of the bitumen, either by information from the bitumen producer or by suitable tests, and determine the maximum fire-safe handling temperature, and do not exceed that temperature in heating bitumen; but in no case heat bitumen to a temperature higher than 25 deg. F. below the flash point.
- C. Shingling of Plies: Lay plied bituminous membranes over insulation and Perlite board with felts shingled uniformly to achieve the required plies in accordance with manufacturer's instructions.
- D. Set on Accessories: Where small roof accessories are set on built-up roofing membrane, set metal flanges in a bed of roofing cement, and seal penetration of membrane with bead of roofing cement to prevent flow of bitumen from membrane.
- E. Install walkway pads in hot asphalt in configuration shown on drawings.
- F. Ensure all bleed outs during application are covered with cool roof granules to create uniform white appearance of entire roof.



3.5 COMPOSITION FLASHING AND STRIPPING

- A. Provide composition flashing at cant strips and other sloping and vertical surfaces, and at roof edges, and at penetrations through roof. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces, as recommended by manufacturer of primary roofing materials. Except where concealed by elastic flashing, apply a heavy coating of roofing cement over composition flashing.

3.6 ROOF DRAINS

- A. Install 1-1/2" x 18" Tapered Edge Strips to form a gradually tapered sump transition from top of insulation to roof drain flange. Minimum sump size to be 4 ft. by 4 ft.
- B. Install roofing plies, starting at the low point (roof drain) in a shingle fashion so that four plies are provided, trimming felt plies at edge of drain flange.
- C. Install a 4# lead flashing (minimum size 30" x 30"), set in bed of flashing cement, on top of roofing plies. Form lead to shape of sump and into drain bowl, trimming neatly approx. 1" beyond ring. Install clamping ring immediately.
- D. Prime top surface of lead with asphalt primer. Allow to dry completely.
- E. Strip in lead with one ply of SBS Modified Bitumen membrane, extending from clamping ring out a minimum of 6" beyond lead; using modified bitumen trowel grade flashing cement.

3.7 CLEANING UP

- A. Take special care to prevent splashing bitumens onto adjacent surfaces and immediately remove all traces of such splashed and/or spilled material.

END OF SECTION 07 52 00



SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Stainless steel cap metal flashing.
2. Stainless steel scupper, conductor heads and downspouts.
3. Aluminum cap flashing.
4. Stainless steel through wall flashing.
5. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.
6. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
7. Separation of contacting surfaces of dissimilar metals.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 07 52 00 "Modified Bituminous Membrane Roofing"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.
- C. Samples: Submit 12" x 12" samples of flashing materials and finishes.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



PART 2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel Flashing Materials

1. Stainless Steel Flashing: ASTM A 240, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, Washington Steel Corp. or approved equal. Thickness as listed below.
 - a. Concealed Flashings: 0.012" thick, thirty (30) gauge (U.S. Standard).
 - b. Exposed Flashings: 0.015" thick, twenty-eight (28) gauge (U.S. Standard).
 - c. Edge Strips: 0.025" thick, twenty-four (24) gauge (U.S. Standard).
2. Through-Wall Flashing: Stainless steel, with sawtooth ribs at three (3) inch intervals.
3. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
4. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view provide eighty (80) percent tin and twenty (20) percent lead.
5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.

B. Downspouts: 4" SCH 10 304 stainless steel pipe.

C. Aluminum Flashing: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; mill finish for concealed flashing; 0.032" thick.

1. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel, or aluminum.
2. Exposed Coil-Coated Finish: Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Color: As selected by the Commissioner.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.



PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 METAL FLASHING INSTALLATION

- A. Reference Standard: Conform to the requirements of 7th Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.
- B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.
- C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.
- D. Cleating: Use cleats where sheets are more than twelve (12) inches in width. Space cleats approximately twelve (12) inches o.c.. Cleats two (2) inches wide by three (3) inches long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with two (2) nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.
- E. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.
- F. Soldering: Mechanically clean all metal surfaces to be soldered with steel wool. Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Provide liberal amount of flux brushed in at seams before commencing soldering. Where soldering paste or killed acid is employed as a flux, soldering must follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.
- G. Slip Joints: Locate slip joints not more than twenty four (24) feet apart and within 2' of corners and changes in direction. Form slip joints as three (3) inch wide joints with cover piece behind flashing, and fill locked ends neatly with sealant.



- H. Cap Flashing: Install over base flashings, in eight (8) to ten (10) foot lengths, lapped six (6) inches at ends. Increase cap flashing longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Lap cap flashing over base flashing at least four (4) inches, with exposed bottom edge at a forty five (45) degree angle downward and folded back on underside at least 1/2" to form drip. Make cap flashing continuous at corners and angles.
- I. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein, but indicated on drawings and/or required to provide a watertight installation.
- J. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.
- K. Reglets
 - 1. Provide watertight reglets in masonry and concrete work to receive cap flashing. Form reglets of stainless steel using same thickness as stainless steel sheet metal specified.
 - 2. In masonry work use open or closed slot reglets with slot at least one (1) inch deep and 3/16" wide. Provide hook dams or turn-ups for anchoring securely into mortar joints. Insert cap flashing into slot full depth using button punch or lead wedges to lock in place.
 - 3. In concrete work, use open or closed slot reglets with slot sloped upward at forty five (45) degrees, at least one (1) inch deep and 3/16" wide. For fastening reglets to concrete forms use double-head stainless steel nails spaced twelve (12) inches apart maximum.
 - 4. Insert cap flashing full depth into reglet slot, and wedge in place using lead strips spaced on twelve (12) inch centers maximum or lead caulking rope. When lead strips are used for continuous caulked reglets, use approved weather-resistant fibrous compounds.
- L. Through-the-Wall Flashings: Provide through-the-wall flashings as shown. Form bonding features so as not to puddle water on surface. Lap cross joints to interlock design pattern at least three (3) inches. Stop typical flashings in mortar joint 1/2" from exterior face of wall.
- M. Scupper: Continuously support scupper, set to correct elevation, and seam frames to interior wall face, over cants or tapered edge strips, and under roofing membrane.

END OF SECTION 07 62 00



SECTION 07 71 00

ROOF SPECIALTIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Aluminum gravel stops and copings.
2. Roof hatches.
3. Prefabricated roof curbs.
4. Non-penetrating safety guardrail system.

- B. Related Sections

1. Section 07 52 00 "Modified Bituminous Membrane Roofing"
2. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal flashing.
3. Section 08 62 00 "Unit Skylights"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

PART 2 PRODUCTS

2.1 ALUMINUM GRAVEL STOPS AND COPINGS

- A. Fabricate of .063" thick aluminum alloy 5005-H154, smooth, no pattern.



- B. Provide concealed splice plates 12'-0" o.c. fabricated of .050" thick aluminum to match exposed aluminum; finished to match exposed aluminum.
- C. Provide prefabricated mitered and welded corner units.
- D. For gravel stops, provide concealed anchors and hold down clips 24" o.c.
- E. For copings, provide galvanized steel anchor plates, anchors spaced 6'-0" o.c. and snap-lock coping design; all anchors concealed.
- F. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Custom color and gloss as selected by the Commissioner.
- G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hickman
 - 2. Cheney
 - 3. Johns Manville
 - 4. Or approved equal.

2.2 ROOF HATCH

- A. Provide shop-primed, aluminum roof hatch units of sizes shown on drawings, with 1" rigid insulation at curbs and door and standard self-lifting mechanism. Provide manufacturer's standard hardware, including hold-open device, hinges, latch and operating handles for inside operation. Construct units for 40 lbs. per sq. ft. live load.
- B. Safety Railing System: Manufacturer's standard complete system including rails, clamps, fasteners, safety barrier at railing opening, and all accessories required for a complete installation.
 - 1. Height: 42 inches above finished roof deck.
 - 2. Test load per 2008 New York City Building Code requirements.
 - 3. Provide self-latching gate fabricated of same materials as safety railing system.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:



1. Bilco
2. Babcock-Davis
3. Milcor
4. Or approved equal.

2.3 PREFABRICATED ROOF CURBS

- A. Provide manufacturer's standard shop fabricated units made of 14 ga. zinc coated steel factory primed with rust inhibitive primer, and insulated with 1-1/2" thick fiberglass board. Provide units manufactured by Pate, Louvers & Dampers, Inc., Industrial Louvers, Inc., or approved equal.
- B. Reinforce units over 8'-0" long and units requiring reinforcement due to heavy loads by forming units of double-walled box-type construction with stiffeners of heavy gauge with flanges as required to provide sufficient rigidity and strength to withstand max. lateral forces in addition to super imposed vertical loads.
- C. Sloping roof decks: For deck slopes of 1" per ft. and more, fabricate curb units (except expansion joint curbs) to form a level top edge. Where slope is less than 1" per ft., and curb is used to support equipment with moving parts, or supports vertical elements such as gravity ventilators which are intended to be plumb, provide tapered wood nailers (treated wood) at top of curb units to form a level top edge.
- D. Provide treated wood nailer, not less than 1-5/8" thick and of the width shown, but not less than the width of the curb wall assembly. Anchor nailer securely to the top of the metal frame unit. Refer to Section 062000 Finish Carpentry for pressure treatment required for wood nailers.
- E. Provide 22 ga. galvanized steel curb liners; where required extend curb liners through deck construction to coordinate with work below.
- F. Provide 18 ga. galvanized steel cap flashing to cover a min. of 3" over roof flashing.
- G. Where curb units are shown to support shop fabricated items of equipment, do not proceed with fabrication of curb units until size or dimensions have been checked for coordination with equipment.

2.4 NON-PENETRATING SAFETY GUARDRAIL SYSTEM

- A. Guardrail system must meet OSHA 1910.23(c) and 1926.502(b).
 1. Configuration/Size: As indicated on Drawings.
 2. Color: As selected by Commissioner.



- B. Basis-of-Design Product: Subject to compliance with requirements, provide Garlock Safety Systems; Railguard 200 Non-Penetrating Safety Guardrail System or comparable product by one of the following:
1. Kee Safety Inc.
 2. Dakota Safety
 3. Or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- D. Operational Units: Test operational units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

END OF SECTION 07 71 00



SECTION 07 81 00

APPLIED FIREPROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
1. Spray-on fireproofing for structural steel.
 2. Seal coat over fireproofing in special areas.
 3. Preparation of surfaces.
 4. Field quality control.
- B. Related Sections
1. Section 05 12 00 "Structural Steel Framing"
 2. Section 07 84 13 "Penetration Firestopping"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: For each fire-resistive product specified.
- C. Shop Drawings: Submit structural framing plans indicating the following:
1. Locations and types of surface preparations required before applying sprayed fire-resistive material.
 2. Extent of sprayed fire-resistive material for each construction and fire-resistance rating, including the following:
 - a. Applicable fire-resistive design designations of a qualified testing and inspecting agency acceptable to New York City Building Department.
 - b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.



3. Identify restrained and unrestrained assemblies on shop drawings, show required thickness of fireproofing for each assembly.
- D. Product Certificates: Signed by manufacturer of sprayed fire-resistive material certifying that the products furnished comply with requirements.
 - E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
 - F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of commissioners and City of New Yorks, and other information specified.
 - G. If primer is to be used steel and/or metal deck, submit certifications by supplier of primer that primer is compatible with materials, and will not impair the required performance of the installed fireproofing. Such certification must be accompanied by evidence that the primer was successfully used in conjunction with the fireproofing material in a UL test applicable to the construction. Submit this certification prior to application of primer.
 1. Coordinate with Section 05 12 00 – Structural Steel Framing, and Structural Drawings prior to application of primer.
 - H. Product Test Reports: Indicate that physical properties of proposed sprayed fire-resistive materials comply with specified requirements based on comprehensive testing of current product formulations by a qualified testing and inspecting agency according to requirements specified in "Quality Assurance" Article.
 - I. Code Compliance: Proposed product must comply with the 2008 New York City Building Code and be approved by New York City Building Department.
 - J. Letter from manufacturer stating that the UL Design selected for the project are not load restricted.
- 1.4 QUALITY ASSURANCE
- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
 - B. Installer Qualifications: Engage an experienced installer.
 - C. Submit data indicating that products containing no detectable asbestos as determined according to the method specified in 40 CFR, Part 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
 - D. Mockups: After processing of initial submittals and before delivery and installation of fireproofing materials, prepare a sample installation of fireproofing work, approximately 100 sq. ft. in area; providing an example of each type required, applied on each different substrate, to produce each different rating as required and reasonably



representative of entire sprayed on fireproofing work, for joint approval by representative of fire resistant material manufacturer and City of New York. Work in other areas must not proceed until mock-up has been completed. Mock-up work which remains in compliance with requirements and is in undamaged and acceptable condition may be retained as final work in place.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; shelf life, if applicable; and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, aboveground, so they are kept dry until ready for use. Remove from Project site and discard materials that have deteriorated.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply sprayed fire-resistive material when ambient or substrate temperatures are 40 deg F. or lower, unless temporary protection and heat is provided to maintain temperatures at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of sprayed fire-resistive material to achieve a minimum of four air changes per hour. Use natural means or, where this is inadequate, forced-air circulation until fire-resistive material dries thoroughly.

1.7 SEQUENCING

- A. Sequence and coordinate application of sprayed fire-resistive materials with other related work specified in other Sections to comply with the following requirements:
 - 1. Provide temporary enclosures for interior applications to prevent deterioration of fire-resistive material due to exposure to unfavorable environmental conditions.
 - 2. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 3. Do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material. Fireproofing may be considered dry when the moisture content is 6% or less.
 - 4. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.



5. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
6. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, tested, and corrections have been made to defective applications.
7. Protect permanently exposed walls, floor or special surfaces.

PART 2 PRODUCTS

2.1 CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

- A. General: For concealed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated in this Article for material composition and physical properties representative of installed products.
- B. UL design listings must state that the loading was determined by Allowable Stress Design Method or Load and Resistance Factor Design Method. UL design listings requiring a load restriction factor will not be allowed.
- C. Material Composition: Cementitious sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
- D. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed as follows:
 1. Dry Density: Minimum 15 lb./cu. ft. for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
 2. Thickness: Provide minimum average thickness required for fire-resistive design shown on approved submittals.
 - a. Fireproofing must be of thicknesses and density to meet the requirements of the 2008 New York City Building Code for Type of construction indicated on drawings for 2 hour rating.
 3. Bond Strength: Not less than 200 lbf/sq. ft. per ASTM E 736.
 4. Compressive Strength: 5.21 lbf/sq. in. as determined in the laboratory per ASTM E 761. Minimum thickness of sprayed fire-resistive material tested must be



0.75 inch and minimum dry density must be as specified, but not less than 15 lb./cu. ft.

5. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
 6. Deflection: No cracking, spalling, delamination, or the like per ASTM E 759.
 7. Effect of Impact on Bonding: No cracking, spalling, delamination, or the like per ASTM E 760.
 8. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours per ASTM E 859. For laboratory tests, minimum thickness of sprayed fire-resistive material is 0.75 inch, maximum dry density is 15 lb./cu. Ft., test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.
 9. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E84 by UL or another testing and inspecting agency acceptable to New York City Building Department.
 - a. Flame Spread: 10 or less.
 - b. Smoke Developed: 0.
 10. Fungal Resistance: No observed growth on specimens per ASTM G 21.
- E. Product: Subject to compliance with requirements, provide one of the following:
1. Pyrolite 5GP; Carbolite Co., Fireproofing Products Div.
 2. Monokote Type MK-6; W.R. Grace & Co. - Conn., Construction Products Div.
 3. Cafco 300; Isolatek International Corp., Cafco Products.
 4. Type F3; Promat Firetemp.
 5. Or approved equal.

2.2 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with sprayed fire-resistive materials and substrates and are approved by UL or another testing and inspecting agency acceptable to New York City Building Department for use in fire-resistive designs indicated.
- B. Adhesive for Bonding Fire-Resistive Material: Product approved by manufacturer of sprayed fire-resistive material, used where required by manufacturer to ensure proper bond.



- C. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistive designs indicated and fire-resistive product manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive sprayed fire-resistive material.
- D. Sealer for Sprayed Fire-Resistive Material in Elevator Shafts and Open Area Plenums: Transparent-drying, water-dispersible protective coating compatible with sprayed fire-resistive material and recommended by sprayed fire-resistive material manufacturer.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Clean substrates of substances that could impair bond of fire-resistive material, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.
- B. For exposed applications, restore substrates to remove any surface imperfections that could affect uniformity of texture and thickness in finished surface of sprayed fire-resistive material. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.
- C. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and ensure maintenance of adequate ambient conditions for temperature and ventilation.

3.3 INSTALLATION

- A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to convey and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Install metal lath, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by fire-resistive material manufacturer. Attach lathing accessories where indicated or required for secure attachment to substrate.
- C. Coat substrates with adhesive before applying fire-resistive material where required to achieve fire-resistance rating or as recommended in writing by fire-resistive material manufacturer for material and application indicated.



- D. Extend fire-resistive material in full thickness over entire area of each substrate to be protected.
- E. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by method recommended by the manufacturer.
- F. Where sealers are used, apply products that are tinted to differentiate them from the sprayed fire-resistive material over which they are applied. Apply sealers at rated recommended by sprayed fire-resistive material manufacturer to maintain fire-resistance ratings.
- G. Maintain ambient conditions during installation and for cure period following installation, as recommended by manufacturer. Provide ventilation and avoid excessive rate of drying.
- H. Fireproofing to the underside of roof deck assemblies must be done only after roofing application is complete, all roof mounted mechanical equipment is in place, and the roof is watertight.
- I. No fireproofing may be applied prior to completion of concrete work on steel decking.
- J. Installation Sequence of Fireproofing
 - 1. Perform all patching and restoration of sprayed fireproofing, due to cutting trades or testing and inspection, under this Section.
- K. Make provisions for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation must be provided.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency for Special Inspections: City of New York will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing and inspecting of completed applications of sprayed fire-resistive material will take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of fire-resistive material for the next area until test results for previously completed applications of fire-resistive material show compliance with requirements.
 - 1. For each 1000-sq. ft. area, or partial area, on each floor, testing and inspecting agency will evaluate the following characteristics. Tested values must equal or exceed values indicated and values required for approved fire-resistance design.



- a. Thickness for Floors, Roofs, and Walls: From the average of 10 measurements from a 144-sq. in. sample area, with sample width of not less than 6 inches per ASTM E 605.
2. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
3. For each 10,000 sq. ft. area, or partial area, on each floor, testing and inspection agency will evaluate the following characteristics. Tested values must equal or exceed values indicated and values required for approved fire resistance design.
 - a. Bond Strength for Floors, Roofs, Walls, and Structural Framing Members: Cohesion and adhesion at frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 736.
4. Density for Floors, Roofs, Walls, and Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
5. When testing discovers applications of fire-resistive material not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.
- C. Remove and replace applications of fire-resistive material where test results indicate that they do not comply with specified requirements for cohesion and adhesion or for density, or both.
- D. Apply additional fire-resistive material per manufacturer's written instructions where test results indicate that thickness does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 07 81 00



SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
4. Sealant joints in fire-resistance-rated construction.
5. Penetrations at each floor level in shafts and/or stairwells.
6. Construction joints, including those between top of fire rated walls and underside of floors above; and those between exterior curtain walls and the outer perimeter edge of floor assemblies.

B. Related Sections

1. Section 03 30 00 "Cast-in-Place Concrete"
2. Section 04 20 00 "Unit Masonry"
3. Section 07 92 00 "Joint Sealants"
4. Section 09 29 00 "Gypsum Board"

1.3 REFERENCES

- A. ASTM E 814 "Standard Method of Fire Tests of Through-Penetration Firestops."



- B. UL 1479, UBC 7-5 (Both are same as A. above).
- C. ASTM E 136 "Standard Test Method for Assessing Combustibility of Materials.
- D. UL 263, UBC 7-1 (Both are same as C. above).
- E. UL 2079 "Tests for Fire Resistance of Building Joint Systems."
- F. ASTM E 1399 "Test for Dynamic Movement Conditions."
- G. ASTM E 1966 (Same as E. above).
- H. Published Through-Penetration Systems by recognized independent testing agencies.
 - 1. UL Fire Resistance Directory, Volume II of current year.
 - 2. Warnock Hersey Certification Listings, current year.
 - 3. Omega Point Laboratories, current year.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit manufacturer's product literature for each type of firestop material to be installed. Submit literature indicating product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.
- C. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, for proposed UL listed (or equal) firestop and smoke seal assembly required for the Project.
- D. Material Safety Data Sheets: Submit MSDS for each firestop product.
- E. Qualification Data: For Installer.
- F. Manufacturer's Letters: For installations or configurations not covered by a UL or Warnock Hersey design number, obtain a recommendation from the manufacturer, in writing, for the specific application.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. General: Provide firestopping systems that are produced and installed to resist the spread of fire, and the passage of smoke and other gases.



- C. Firestopping materials must conform to Flame (F) and Temperature (T) ratings as required by 2008 New York City Building Code and as tested by nationally accepted testing agencies per ASTM E 814 or UL 1479. The F-rating must be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated. T-rating, when required by 2008 New York City Building Code, must be based on measurement of the temperature rise on the penetrating item(s). The fire test must be conducted with a minimum positive pressure differential of 0.01 inches of water column.
- D. Firestopping products must be asbestos free and free of any PCBs.
- E. Do not use any product containing solvents or that requires hazardous waste disposal.
- F. Do not use firestop products which after curing, dissolve in water.
- G. Do not use firestop products that contain ceramic fibers.
- H. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- I. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.
- J. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.
- B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.
- C. All firestop materials must be installed prior to expiration of shelf life.



1.7 PROJECT CONDITIONS

- A. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.
- B. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.
- C. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.
- D. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.
- E. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.

1.8 SEQUENCING AND SCHEDULING

- A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- B. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.
- C. Do not cover firestop systems until they have been properly inspected and accepted by the inspecting agency.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following manufacturers:
 - 1. Tremco
 - 2. Bio-Fireshield
 - 3. 3M
 - 4. Specified Technologies Inc.
 - 5. U.S. Gypsum Co.
 - 6. Nelson
 - 7. Hilti, Inc.
 - 8. Grace Flame Safe



9. Or approved equal.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials including the following:
 - a. Semirefractory fiber (mineral wool) insulation.
 - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Joint fillers for joint sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- D. Smoke seals at top of partitions must be flexible to allow for partition deflection.

2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
- B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.
- C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethylene foil on one side.



- E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.
- F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.
- I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless firestop system limits use to non-sag grade for both opening conditions.

2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
 - 1. Sealant Colors: Color of exposed joint sealants as selected by the Commissioner.
- B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.
 - 1. Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.
- C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.
 - 1. Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated.



- D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.
- 2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)
- A. Provide min. 4 pcf safing insulation to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.
- B. Material must be classified non-combustible when tested per ASTM E 136.
- C. Product: Subject to compliance with requirements, provide one of the following:
1. Thermafiber, Inc. (an Owens Corning company); Thermafiber Safing Mineral Wool Insulation
 2. Rockwool; Roxul Safe Fire Safing Insulation
 3. Johns Manville; Mineral Wool Safing
 4. Or approved equal.
- 2.6 MIXING
- A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form release agents from concrete.



- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 CONDITIONS REQUIRING FIRESTOPPING

A. Building Exterior Perimeters

- 1. Where exterior facing construction is continuous past a structural floor, and a space (i.e. construction joint) would otherwise remain open between the inner face of the wall construction and the outer perimeter edge of the structural floor, provide firestopping to equal the fire resistance of the floor assembly.
 - a. If mineral wool is part of firestop system, the mineral wool must be completely covered by appropriate thickness of UL or Warnock Hersey listed firestop sealant or spray.
 - b. Refer to Article 3.6 herein for description of fire safing insulation.
- 2. Provide firestopping whether or not there are any clips, angles, plates, or other members bridging or interconnecting the facing and floor systems, and whether or not such items are continuous.
- 3. Where an exterior wall passes a perimeter structural member, such as a girder, beam, or spandrel, and the finish on the interior wall face does not continue up to close with the underside of the structural floor above, thus interrupting the fire-resistive integrity of the wall system, and a space would otherwise remain open between the interior face of the wall and the structural member, provide firestopping to continuously fill such open space.

B. Interior Walls and Partitions

- 1. Firestop construction joints between top of fire rated walls and underside of floors above.
- 2. Test installed firestop system by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.
- 3. Firestop system used must allow for deflection of floor above.

C. Penetrations

- 1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.



2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.
 3. These requirements for penetrations apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.
- D. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

- A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:
 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint



width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

- D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.6 INSTALLING FIRESAFING INSULATION

- A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.
- B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, provide insulation at least four (4) inches deep top to bottom.
- C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

- A. Special inspecting agency employed and paid by the City of New York will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor and Commissioner.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.
- D. Where deficiencies are found, Contractor must restore or replace firestopping so that it complies with requirements.

3.8 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to product firestopping complying with specified requirements.

END OF SECTION 07 84 13



SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Flashing reglets and retainers.
2. Coping joints.
3. Exterior wall joints not specified to be sealed in other Sections of work.
4. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
5. Control and expansion joints in walls.
6. Joints at wall penetrations.
7. Joints between items of equipment and other construction.
8. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

B. Related Sections

1. Section 07 52 00 "Modified Bituminous Membrane Roofing"
2. Section 07 84 13 "Penetration Firestopping"
3. Section 08 81 00 "Glass Glazing" for glazing sealants.
4. Section 09 29 00 "Gypsum Board" for sealant within drywall construction.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".



- B. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.
 - 1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.
- C. Samples: Submit the following:
 - 1. Color samples of sealants, submit physical samples (not color chart).
 - 2. Sealant bond breaker and joint backing.
- D. Product Data: Submit manufacturer's technical information and installation instructions for:
 - 1. Sealant materials, indicating that material meets standards specified herein.
 - 2. Backing rods.
- E. Submit manufacturer's certification as required by Article 1.5 herein.
- F. Submit results of testing required in Article 1.4 herein.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and experienced in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.
- C. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.
- D. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. Do not start sealant work until results of these tests have been submitted and Commissioner has given written approval to proceed with the work.

1.5 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

- A. Contractor must require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor must submit to the Commissioner written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance requirements.



1.6 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Storage: Store sealant materials and equipment under conditions recommended by their manufacturer.
 - 1. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
 - 2. Store material in unopened containers with manufacturers' name, batch number and date when shelf life expires.

1.8 WARRANTY

- A. Provide a written, notarized warranty from the manufacturer stating that the applied sealants will show no material failure for a period of ten (10) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

- A. Exterior Wall Sealant: Provide one (1) part non-sag sealant conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50.
 - 1. Product: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning; No. 790 or 795
 - b. G.E.; Silpruf SCS 2000 or LM SCS 2700
 - c. Tremco; Spectrem 1 or Spectrem 3
 - d. Sonneborn; Sonolastic 150
 - e. Or approved equal.
- B. Interior Sealant: Provide a one (1) part acrylic based sealant conforming to ASTM C 834.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pecora; AC-20+ Silicone or comparable product by one of the following:
 - a. Tremco
 - b. Sherwin Williams



c. Or approved equal.

C. Colors: Colors selected from manufacturer's standard selection.

2.2 MISCELLANEOUS MATERIALS

A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, twenty-five (25) percent wider than joint width. Do not use materials impregnated with oil, bitumen or similar materials. Provide back-up materials only as recommended by sealant manufacturer in writing.

B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.

C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.

D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements apply.

B. Sample Section of Sealant

1. During sealant installation work in exterior wall, the manufacturer of sealant must send a representative to the site, under whose supervision a section of the wall (used as "control section") must be completed for purposes of determining performance characteristics of sealant in joints. Commissioner must be informed of time and place of such installation of control section.

2. Install control section according to specification given herein and will not be considered as acceptable until written acceptance is provided by the Commissioner.

3. Accepted control section will be standard to which all other sealant work must conform.



- C. Supervision: Submit to the Commissioner written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. Use only skilled and experienced workmen for installation of sealant.
- D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Use gun with nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.
- E. Preparation and Application
 - 1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
 - 2. Clean stone, masonry and concrete surfaces to receive sealant by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
 - a. Do not use any acid or other material which might stain surfaces.
 - b. Remove laitance by grinding or mechanical abrading.
 - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
 - 3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
 - 4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.
 - 5. Joint Size and Sealant Size: Minimum 1/4" wide. In joint 1/4" to 3/8" wide, provide sealant 1/4" deep. In joints wider than 3/8" and up to 1" wide, provide sealant depth one half the joint width. For joints wider than 1", provide sealant depth as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
 - 6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming. Apply primer with clean brush and only when temperature is above 45 deg. F.
 - 7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper



joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Install joint backing with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.

8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 5A in ASTM C 1193. Finished joints must be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.

END OF SECTION 07 92 00



SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.
2. Exterior doors and frames prepared and finished per Section 09 90 00, Painting and Coating.
3. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
4. Preparation of hollow metal doors to receive glazing where required.
5. Furnishing anchors for building into masonry and drywall.
6. Factory prime painting of work of this Section.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 06 20 00 "Finish Carpentry" for installation of doors and frames.
3. Section 08 71 00 "Finish Hardware"
4. Section 08 81 00 "Glass Glazing"
5. Section 09 29 00 "Gypsum Board"
6. Section 09 90 00 "Painting and Coating"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".



- B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- C. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.
- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
 - 1. Coordinate glazing frames and stops with glass and glazing requirements.
- E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit UL certification that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.
- D. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.
- E. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80, Standard for Fire Doors and Other Opening Protectives, that are listed and labeled by UL, for fire-protection ratings indicated.
 - 1. Test Pressure: Test according to NFPA 252, Standard Methods of Fire Tests of Door Assemblies, or UL 10C, Standard for Positive Pressure Fire Tests of Door Assemblies. After 5 minutes into the test, the neutral pressure level in furnace must be established at 40" or less above the sill.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide UL certification that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.



3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating as required by 2008 New York City Building Code in 30 minutes of fire exposure.
 - F. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80, Standard for Fire Doors and Other Opening Protectives, that are listed and labeled, by a testing and inspecting agency acceptable to the Commissioner, for fire-protection ratings indicated, based on testing according to NFPA 257, Standard on Fire Test for Window and Glass Block Assemblies, or UL 9, Standard for Fire Tests of Window Assemblies. Label each individual glazed lite.
 - G. Smoke-Control Door Assemblies: Comply with NFPA 105, Standard for Smoke Door Assemblies and Other Opening Protectives, or UL 1784, Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
 - B. Store doors and frames under cover at building site. Conform to the requirements of ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames, for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

PART 2 PRODUCTS

2.1 FABRICATION - GENERAL

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.



2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Steelcraft
 2. Curries
 3. Ceco Door Products
 4. Or approved equal.

2.3 FRAMES

- A. Materials
1. Frames for exterior openings: Commercial grade cold-rolled steel conforming to ASTM A 1008, Standard Specification For Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy With Improved Formability, Solution Hardened, And Bake Hardenable, Type B not less than 14 ga., and with a hot dipped galvanized coating conforming to ASTM A 924, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process, and A 653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process, with A-60 coating. Provide zinc-alloy coating with a dull matte surface treated for paint adhesion.
 2. Frames for interior openings: Either commercial grade cold-rolled steel conforming to ASTM A 1008, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy With Improved Formability, Solution Hardened, And Bake Hardenable, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011, Commercial Steel, Type B. Metal thickness: As shown on the drawings.
- B. Design and Construction
1. All frames must be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knocked down frames are not permitted.
 2. All finished work must be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members must be clean cut, straight and of uniform profile throughout their lengths.
 3. Jamb depths, trim, profile and backbends: As shown on drawings.



- a. Frames at drywall partitions: Formed with double return backbends to prevent cutting into drywall surface.
4. Provide welded frames with corners mitered and reinforced and faces of welded frames continuously back welded full depth and width of frame conforming to NAAMM Standard HMMA-820; provide hairline face joints.
5. Minimum depth of stops: 5/8"
6. Frames for multiple or special openings must have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members must be securely welded and finished smooth.
 - a. Mullions must have 16 ga. internal steel stiffeners welded not less than 4" o.c.
7. Hardware Reinforcements
 - a. Frames must be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames must have reinforcing plates.
 - b. Minimum thickness of hardware reinforcing plates:
 - 1). Hinge and pivot reinforcements - seven (7) ga., 1-1/4" x 10" minimum size.
 - 2). Strike reinforcements - twelve (12) gauge
 - 3). Flush bolt reinforcements - twelve (12) gauge
 - 4). Closer reinforcements - twelve (12) gauge
 - 5). Reinforcements for surface mounted hardware - twelve (12) gauge.
8. Floor Anchors
 - a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
 - b. Minimum thickness of floor anchors: Fourteen (14) gauge.
9. Jamb Anchors
 - a. Provide frames for installation in masonry walls with adjustable jamb anchors of the wire type. Anchors: Minimum 0.156" diameter steel wire. The number of anchors provided on each:
 - 1). Frames up to 7'-6" height - three (3) anchors.
 - 2). Frames 7'-6" to 8'-0" height - four (4) anchors.
 - 3). Frames over 8'-0" height - one (1) anchor for each 2'-0" or fraction thereof in height.



- b. Provide frames for installation in stud partitions with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb as follows:
 - 1). Frames up to 7'-6" height - four (4) anchors.
 - 2). Frames 7'-6" to 8'-0" height - five (5) anchors.
 - 3). Frames over 8'-0" height - five (5) anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".
 - c. Provide frames to be anchored to previously placed concrete or masonry with minimum 3/8" concealed bolts set into expansion shields or inserts at six (6) inches from top and bottom and twenty-four (24) inches o.c. Reinforce frames at anchor locations with sixteen (16) gauge sheet steel stiffeners welded to frame at each anchor.
- 10. Anchors in exterior frames and in masonry walls: Hot dip galvanized per ASTM A 153.
 - 11. Provide frames for installation in masonry wall openings more than 4'-0" in width with an angle or channel stiffener factory welded into the head. Such stiffeners must be not less than twelve (12) gauge steel and not longer than the opening width, and must not be used as lintels or load bearing members.
 - 12. Provide dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge steel at all hardware mortises on frames to be set in masonry or plaster partitions.
 - 13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
 - 14. Provide all frames with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
 - 15. Loose glazing stops: Cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.
 - 16. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.
- C. Finish: After fabrication, remove all tool marks and surface imperfections, and dress smooth exposed faces of all welded joints. Then chemically treat frames to ensure maximum paint adhesion and coat on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.
- 1. Grout in frames set in masonry walls as described in Section 04 20 00, "Unit Masonry."



2. Epoxy coating for surfaces in contact with grout: Epoxy coating spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; Series 27 FC Typoxy or comparable product by one of the following:
 - 1). PPG
 - 2). Benjamin Moore
 - 3). Sherwin Williams
 - 4). Or approved equal.

2.4 HOLLOW METAL DOORS

- A. Materials: Commercial quality, level, cold rolled steel conforming to ASTM A 1008/A, Commercial Steel, Type B and free of scale, pitting or other surface defects.
 1. Face sheets for interior doors: As shown on the drawings.
 2. Face sheets for exterior doors: As shown on the drawings.
 3. Prepare and finish doors per Section 09 90 00, Painting and Coating, for exterior steel elements.
- B. Design and Construction
 1. Provide doors of the types and sizes shown on the approved shop drawings, of fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness: 1-3/4".
 2. All doors must be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends must be true and straight and of minimum radius for the gauge of metal used.
 3. Face sheets must be stiffened by continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners must be not less than twenty two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners must be sound deadened and thermal insulated the full height of the door with an inorganic non-combustible batt type material.
 4. Door faces must be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds must be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
 5. Top and bottom edges of all doors must be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces.
 6. Edge profiles must be provided on both vertical edges of doors as follows:



- a. Single-acting swing doors - beveled 1/8" in two (2) inches.
- b. Double acting swing doors - rounded on 2-1/8" radius.
- c. No square edge doors permitted.

7. Hardware Reinforcements

- a. Doors must be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors must have reinforcing plates.
- b. Minimum gauges for hardware reinforcing plates must be as follows:
 - 1). Hinge and pivot reinforcement - seven (7) gauge.
 - 2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - twelve (12) gauge.
 - 3). Reinforcements for all other surface mounted hardware - sixteen (16) gauge.

8. Glass Moldings and Stops

- a. Where specified or scheduled, provide doors with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
- b. Securely weld fixed moldings to the door on the security side.
- c. Loose stops: Minimum twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Provide stops flush with face of door.

C. Finish: After fabrication, remove all tool marks and surface imperfections, and dress, fill and sand as required to make all faces and vertical edges smooth, level and free of all irregularities. Then chemically treat doors to ensure maximum paint adhesion and coat on all exposed surfaces with manufacturer's standard rust-inhibitive alkyd primer as specified for frames which is fully cured before shipment.

D. Flatness: Maintain a flatness tolerance of 1/16" maximum for doors, in any direction, including in a diagonal direction.

2.5 LABELED DOORS AND FRAMES

- A. Provide labeled doors and frames for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames must be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.
- B. If any door or frame specified by the Commissioner to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, advise the Commissioner before fabricating work on that item is started.



2.6 HARDWARE LOCATIONS

- A. The location of hardware on doors and frames must be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by 2008 New York City Building Code.

2.7 CLEARANCES

- A. Fabricate doors and frames to meet edge clearances as follows:
 - 1. Jambs and Head: 1/8" plus or minus 1/16".
 - 2. Meeting Edges, Pairs of Doors: 1/8" Plus or minus 1/16".
 - 3. Bottom: 3/4", if no threshold.
 - 4. Bottom: 3/8", at threshold.
- B. Fire rated doors must have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

- A. Maintain manufacturing tolerance within the limits given in HMMA 841 of ANSI/NAAMM, current edition.

2.9 PREPARATION FOR FINISH HARDWARE

- A. Prepare door and frames to receive hardware:
 - 1. Hardware supplier must furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to ensure correct fitting and installation.
 - 2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.
- B. Provide reinforcements for both concealed and surface applied hardware:
 - 1. Drill and tap mortise reinforcements at factory, using templates.
 - 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSTALLATION

- A. Refer to Section 06 20 00, Finish Carpentry, for installation procedures for all work of this Section.

END OF SECTION 08 11 13



SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Frameless recessed panel access doors at drywall ceilings and walls.
2. Framed flush panel access doors at masonry walls.
3. GFRG access panels for drywall ceilings.
4. Frameless access panels for tile walls.
5. Provide access doors and frames for access from occupied spaces to the following, where indicated or required.
 - a. All shutoff or balancing valves.
 - b. Fire dampers, as required.
 - c. Points of duct access.
 - d. Pull boxes.
 - e. Controls of mechanical and electrical items.
 - f. Masonry shafts for pipes and conduits, as required.
 - g. Pipe spaces, if required.
 - h. Inlets of fans.
 - i. Fusible link and splitter damper at filter bank.
 - j. Automatic damper and motor.
 - k. Equipment not otherwise accessible.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 09 29 00 "Gypsum Board"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".



- B. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Commissioner. Submit plans and schedules showing size and location of each and every access door for the Commissioner's acceptance prior to installation.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and experienced in the skills required.
- C. Fire-Resistance Ratings: Wherever a fire-resistance classification is shown, or for construction where access doors are installed, provide required access door assembly with panel door, frame, hinge and latch from manufacturers listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.
 - 1. Provide UL label on each access panel.
 - 2. Provide flush, key operated cylinder lock.
- D. Size Variations: Obtain Commissioner's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Milcor Inc.
 - 2. Nystrom Inc.
 - 3. Karp Associates, Inc.
 - 4. Or approved equal.

2.2 MATERIALS AND FABRICATION

- A. Assembly must be an integral unit complete with all parts and ready for installation.
- B. Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of the type required to secure access panels to the types of supports shown.



- C. Frames for Masonry Wall Only (Flush Panel Units): Fabricate frame from sixteen (16) gauge steel. Provide frame with exposed flange not less than one (1) inch wide around perimeter of frame for exposed masonry.
 - 1. For installation in masonry construction, provide frames with adjustable metal masonry anchors.
- D. Frameless Units for Drywall Surfaces (Recessed Panel Units): Provide access doors without exposed frames for drywall adhered to recessed panel.
- E. Panels: Fabricate from fourteen (14) gauge steel, with concealed spring hinges set to open to 175 degrees. Provide removable pin type hinges of the quantity required to support the access panel sizes used in the work. Finish with manufacturer's factory applied baked enamel prime coat applied over phosphate protective coating on steel.
- F. Locking Devices
 - 1. For non-rated access doors, provide flush, screwdriver operated cam locks of number required to hold door in flush, smooth plane when closed.
 - 2. For fire rated doors, provide locks as described in paragraph 1.4, C. herein.
- G. Inserts and Anchorage: Furnish inserts and anchoring devices which must be built into masonry for the installation of access panels. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices.

2.3 GFRG ACCESS PANELS

- A. Provide access panels made from glass fiber reinforced gypsum (GFRG) as manufactured by Castle Access Panels and Forms Inc., or equivalent product of Wind-Lock, Formglas, IntexForms, or approved equal.
 - 1. Corners: Rounded corners.
 - 2. Provide access panels architecturally designed to blend seamlessly with drywall ceiling and wall construction. Coordinate work with Section 092900, "Gypsum Board."
 - 3. Panels must be Class A rated, with a flame spread and smoke developed index of 0 in accordance with ASTM E 84.

2.4 FRAMELESS ACCESS PANELS

- A. Recessed Frameless for Tile Wall Only: Karp DSC-210 by Karp or equal by Milcor, Nystrom or approved equal.



PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 COORDINATION

- A. Coordinate all work with the mechanical trades to ensure proper locations and in a timely manner to permit orderly progress of the total work.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and panels after installation for proper operation.

END OF SECTION 08 31 13



SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. High-speed roll up doors.
 - 2. Hardware and accessories.
 - 3. Motor operation.
- B. Related Sections
 - 1. Section 08 71 00 "Finish Hardware"
 - 2. Section 09 90 00 "Painting and Coating"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead coiling door. Include operating instructions and maintenance information.
- C. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturer's data sheets. Final sign off of shop drawings are required by the City of New York.
 - 1. Shop drawings must include attachment to structural elements and identify whether structural elements are in place or provided as part of submittal package.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Furnish each roll up door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.



- C. Provide each type of roll up door by one manufacturer for entire project.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide insulated high-speed roll up doors “Spiral LH” manufactured by Ryttec Corporation, or equal by Albany Door Systems, Cornell Iron Works, Raynor or approved equal.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION OF INSULATED DOOR

- A. Door Panel: Double-walled, aluminum slats are 6 inches high by 1 3/16 inches thick. Integral rubber weatherseal between each of the panels. Door slats are connected by hinge system to provide additional rigidity and security to door panel. Door curtain does not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.
- B. Side Frames: Galvanized steel side frames with full height weatherseal on both sides to seal against door panel. Dual thru-beam photo-eyes mounted within door jamb. Doors using an external coil cord will not be accepted.
- C. Bottom Bar: Extruded aluminum bottom bar with electric, reversing edge that reverses the door upon contacting an object.
- D. Counterbalance: Up to six extension springs in each side column, depending on the size of the door. Springs assist the motor in opening the door. Mechanical release lever on side column allows door to be easily opened in the event of a power failure. Doors using torsion springs for counterbalance or doors with springs located within a barrel will not be accepted.
- E. Drive system: Minimum 2 HP motor with variable speed AC drive which allows for soft acceleration and braking. Doors using a motor with a clutch or pump will not be accepted.
- F. Travel Speed: Opens at up to 60 inches per second and closes at 30 inches per second.
- G. Door to use rotary encoder to regulate door travel limits. Limits to be self-adjusting without the use of tools from floor level at the control panel. Doors using mechanical limits switches or doors that require tools to set the limits will not be accepted.
- H. Door Track: Spiral LH track design features no metal-to-metal contact which results in whisper-quiet, low maintenance operation and eliminates wear on panel slats. Overhead tracks roll back and travel horizontally to accommodate limited headroom of as little as 11”. Doors that roll up on a barrel or whose track design allows metal-to-metal contact will not be accepted
- I. All components must be factory finished.



- J. Electrical Requirements: 208V, 3PH, 5HP.

2.3 INSERTS AND ANCHORAGES

- A. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- B. Refer to concrete and masonry Sections of these specifications for installation of inserts and anchorage devices.

2.4 ELECTRIC DOOR OPERATIONS

- A. Provide electric door operator assembly of the size and capacity recommended and provided by the door manufacturer, complete with electric motor and factory-prewired motor controls, gear reduction unit, solenoid operated brake, clutch, remote control stations and control devices. Operator: Trolley type with worm gear drive.
- B. Provide a hand-operated disconnect or a mechanism for automatically engaging a sprocket chain operator and releasing brake for emergency manual operation. Include an interlock device to automatically prevent the motor from operating when emergency sprocket is engaged.
- C. Design operator so that motor may be removed without disturbing the limit-switch adjustment and without affecting the emergency auxiliary operator.
- D. Provide high-starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move door in either direction, from any position, at not less than 2/3' or more than 1' per second. Coordinate wiring requirements and current characteristics of motors with electrical system of the building.
- E. Provide momentary-contact, key controlled 3-button control station with push button controls labeled "open," "close" and "stop" enclosed in general purpose NEMA Type 1 enclosure.
- F. Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch will immediately reverse downward door travel. Furnish manufacturer's standard take-up reel or self-coiling cable.
 - 1. Provide electrically actuated automatic bottom bar.
- G. Door closing to be timer adjustable.
- H. Provide closing loops.
- I. Provide safety related automatic reversing devices that consist of a light beam crossing under the door.



- J. Provide timing package to call for contacts for access control systems.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install roll up door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- B. Upon completion of installation, including work by other trades, lubricate, test and adjust roll up doors to operate easily, free from warp, twist or distortion and fitting weather-tight for entire perimeter.

END OF SECTION 08 33 23



SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Steel sectional overhead doors.
 - 2. Tracks and hardware.
 - 3. Motor operation.
 - 4. Coordinate overhead support with Section 05 50 00.
- B. Related Sections
 - 1. Section 05 50 00 "Metal Fabrications"
 - 2. Section 09 90 00 "Painting and Coating"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead door. Include manufacturer's operating instructions and maintenance data.
- C. Shop drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed in manufacturer's data.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Provide each sectional overhead door as a complete unit produced by one manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, hardware, operators and installation accessories, to suit openings and head room allowable.



- C. Wind Loading: Design and reinforce sectional overhead doors to withstand a 30 lb. per sq. ft. wind loading pressure with a maximum deflection of 1/120 of opening width.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to restore or replace components of doors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five (5) years from date of Substantial Completion

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Fimbel Door Corporation; Model SI-2024A or comparable product by one of the following:
 - 1. Cornell
 - 2. Overhead Door Company
 - 3. Or approved equal.

2.2 MATERIALS

- A. Construct door sections from 20 ga. galvanized structural quality carbon steel sheets complying with ASTM A924, with a minimum yield strength of 33,000 psi, and a minimum G90 zinc coating complying with ASTM A653. Provide ribbed or fluted sheet to suit manufacturer's standard.
- B. Fabricate sections from a single sheet to provide units not more than 24" high, and nominal 2" deep. Roll horizontal meeting edges to a continuous shiplap rabbeted, or keyed weather seal, with a reinforcing flange return.
- C. Enclose open section with 16 ga. galvanized steel channel end stiles welded in place. Provide intermediate stiles, cut to door section profile, spaced at not more than 48" o.c. and welded in place.
- D. Door shall consist of horizontal, flush steel-insulated sections. Each intermediate section shall be tongue and groove top and bottom to fit together with horizontal joints. No part of door shall project into opening when door is in fully raised position.
- E. Number of panels created by vertical intermediate stiles in each section shall be as follows:
 - 1. Doors 12'-6" wide and less: 3 Panels Across
 - 2. Doors 12'-7" to 16'-2" wide: 4 Panels Across
 - 3. Doors 16'-3" to 20'-2" wide: 5 Panels Across



4. Doors 20'-3" wide and over: 6 Panels Across
 - F. Maximum distance between hinges shall be 48".
 - G. Each section shall be designed to ride with HR-743 or approved equal, 3" sealed solid rollers in the 3" vertical and horizontal tracks, mounted on the interior side of each vertical jamb and overhead under ceiling.
 - H. Horizontal edge of exposed bottom rail of door shall be scribed to contour of grade.
 - I. Measurements of door as indicated hereinafter include a minimum (if field conditions permit) 2 1/2" lap at each existing door opening jamb and 1" lap at head of door opening. Finished thickness of door shall be 2".
 - J. Furnish and install manufacturer's nameplate and rigidly secure to underside of horizontal track angle nearest to chain hoist unit of door. Plate shall permanently indicate name of manufacturer, actual weight of door, length, stretch and pull of each extension spring. Nameplate shall be made of engraved bakelite material with legible letter on a red background.
 - K. Panels: Exterior face to be flush continuous 20 gauge steel. Interior to be continuous embossed 24 gauge aluminum magnesium. Both skins to be laminated to a high density molded foam core to form a rigid sandwich panel with a R12 min energy value and a 30 P.S.F. wind-load rating.
 1. Replacement Sections: Furnish additional Original Equipment Manufactured replacement panels for door as follows:
 - a. Furnish and deliver to City of New York two (2) replacement sections, one bottom and one intermediate, for each door opening. Furnish and install a door label for each replacement (spare) section. Label shall contain the following information: Address, Engine or Ladder Co., size of panel, and whether it as a bottom or intermediate section.
 - b. Hang replacement sections on wall of apparatus floor in area shown on drawings. Provide and install three (3) equidistant painted steel brackets (12" to 18" deep), 8'-10" AFF.
 - 1). Finish paint color: As selected Commissioner.
 - L. Stiles: End stiles to be double end type, 13 gauge, for doors thru 20'-2" wide and triple end type for doors over 20'-2" wide. Intermediate overlay vertical hinge plates to be 3" wide, full section height minimum 16 gauge.
 - M. Finishes: Exterior face to be galvanized with baked-on epoxy primer and factory finished with two (2) coats of electro-statically applied enamel; exterior color to be PPG Industries #3HR 762 691, Tiger Drylac, Ben Moore Industrial or approved equal, Tru-Form Red. Interior skin to have epoxy primer and baked-on white finish.



- N. Windows: For standard design, doors up to 18' wide shall have 2 windows. Doors wider than 18' shall have 4 windows. Windows shall have a rectangular frame 12" x 25", glazed with clear safety glass. Locate windows in third section up from bottom of door, at quarter points of the panel.
- O. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
 - 1. See Section 03 30 00 "Cast-in-Place Concrete" and Section 04 20 00 "Unit Masonry" for installation of inserts and anchorage devices.

2.3 TRACKS, SUPPORTS AND ACCESSORIES

- A. Furnish and install door tracks not less than 11 gauge, 3" x 1-1/2" rolled steel, with vertical tracks inclined rearward in height of each door opening.
- B. Vertical tracks shall be mounted on, and arc welded to, minimum 3" x 3" x 3/16" continuous, structural steel angles. Angles shall extend from grade to a position 12" above cross head shaft over door opening. Angles shall be mounted on, and arc welded to, minimum 4" x 4" x 5/16" continuous structural steel angles, or larger if needed and as specified by Commissioner.
- C. Horizontal tracks shall be mounted on, and arc welded to, minimum 3" x 2" x 3/16" continuous, structural steel angles, supported from steel beams above.
- D. Tracks shall be arc welded to angles with welds not less than 1" in length, spaced not more than 24" o.c.

2.4 HARDWARE

- A. All hinges shall be 11 gauge. Top and bottom fixtures shall be heavy duty type, not less than 13 gauge, of galvanized steel sheet. They shall be graduated in height and agree with inclination of vertical tracks in order to ensure a uniform tight fit to jambs and head of opening when door is in closed position. Hinges and fixture rollers shall operate in perfect freedom from drag or binding at jambs when door is in operation.
- B. End hinges and top fixtures shall be double on all doors thru 20'-2" wide, and triple on all doors over 20'-2" wide. Intermediate hinges shall be installed at every vertical hinge plate. Bottom lifting fixtures shall be reinforced at corner edges and case hardened bolt area. Roller retaining bracket shall be completely welded to bottom fixtures. Attach hinges with heavy duty serrated head lags.
- C. Guide roller shall be solid steel tire, Fimbel Model HR743, or comparable product by Cornell, Overhead Door Company or approved equal, extra heavy duty permanently sealed type with automotive quality bearing. Stem shall be designed with 3/4" x 3/4" reinforcement collar and shall be extra long to accommodate double or triple hinges.



- D. Galvanized steel, reinforcing struts, shall be provided at bottom and top rails and at all intermediate, horizontal section joints as per the following schedule:
1. Doors up to 12'-6" wide: No struts
 2. Doors 12'-7" to 16'-2" wide: 2" high struts
 3. Doors 16'-3" to 19'-2" wide: 2-1/2" high struts
 4. Doors 19'-3" wide and over: 3" high struts

2.5 COUNTERBALANCING MECHANISMS

- A. Coil Springs: Counterbalance door by using heavy duty, high cycle parallel, oil tempered steel coil springs, extension type, with internal coil springs as required. New springs shall be of sufficient size to carry the weight of the door. Door parts shall be mounted above each horizontal door track, at right angles to door opening. Provide a tag wired to each spring, indicating length, stretch and pull. Door shall be balanced, adjusted and installed so that bottom edge of door is above head of required clear opening when in fully open position with hand chain not secured in locking position.
1. Provide a tag wired to each spring indicating length, stretch, pull, and noting High Life Cycle Spring with a single stripe down entire length of spring. Color of painted stripe shall correspond to NAGDM official color codes.
- B. Load Chains: Door shall be hung with heavy duty, straight-link, electrically welded, case hardened, steel load chains that shall be fastened to the bottom cornered lifting fixtures by hardened steel pins or bolts. Chain shall pass up and over minimum 6" cast iron pocket wheels, mounted to cross header shaft and to heavy duty cast iron clevis pulleys at front end of each spring assembly. Pocket wheels shall be a minimum of 6" diameter, keyed and secured to cross head shaft with 1/4" square keys of sufficient length and two (2) set screws.
- C. Shaft: Door shall be provided with a split 1-1/4" diameter, fully round, solid steel, cross head shaft with keyways. Intermediate bearing support assemblies shall be provided for shaft as per manufacturer's recommendation. End bearing plates and intermediate bearings shall be provided for shaft. End bearing plates and intermediate bearings shall be sealed roller bearings.
- D. Cast iron, adjustable coupling sets with keyways shall be provided at center of each shaft as job conditions permit, and at end of shaft that joins operator drive shaft. Couplings shall be secured to shafting with 1/4" square keys of sufficient length and provided with two (2) set screws for each flange end.
- E. Provide split collars on shafting adjacent to pocket wheels, shaft supports and adjustable couplings to prevent walking of operating parts and square keys.



2.6 ACCESSORIES

- A. Spring Guards: Steel guards shall be provided and attached to each horizontal track angle to position springs and pulleys above horizontal track angles. Install in such a manner that they do not interfere with normal operation of extension springs and clevis pulleys.
- B. Safety Wire Cables: Furnish and install safety wire cables (3/16" dia.) which shall run horizontally through extension springs from rear hanger of each horizontal track angle to end plates of front shaft. Cable tension shall be adjusted to withstand spring failure whiplash. Install double ferrules at one end of cable and double clamps at other end.
- C. Weatherstripping
 - 1. Provide and install a 1-1/2" high electrically actuated yellow safety edge to bottom of each door.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide MillerEdge; ME123 or comparable product by one of the following:
 - 1). Zero International,
 - 2). NN Williams
 - 3). Or approved equal.
 - 2. Top of each door will have a factory applied EPDM top seal.
 - 3. For steel jamb applications provide an EPDM jamb and header seal to be fastened to track by means of a clip system to allow for easy adjustment or replacement.
- D. Caulking: Caulk edges of mounting, angles that abut existing steel jamb plates.

2.7 ELECTRIC WORK

- A. New electric door operator, etc.
 - 1. Operator
 - a. Provide and install side-mounted type industrial operator equipped with an emergency hand chain hoist for manual operation of door in case of an electrical malfunction or power failure.
 - 1). Basis-of-Design Product: Subject to compliance with requirements, provide Fimbel Door Corporation; Model WL or comparable product by one of the following:
 - (a). Cornell
 - (b). Overhead Door Company
 - (c). Or approved equal.
 - b. Operator must be mounted vertically and secured to structural steel and/or walls.
 - c. Operator must be installed near overhead door.



2. Motor
 - a. Furnish and install an instant reversing motor, high torque, totally enclosed, of sufficient horsepower to satisfactorily operate door at a speed of 3/4 ft. per second with 12 ft. high doors, taking 16 seconds to open. Motor shall not be less than 3/4 H.P., 208 volts, 3 phase. If Firehouse service is single phase 208/120v, then overhead motor shall be specified as per service.
 - b. Motor shall be tested for dielectric strength, heating and efficiency in accordance with A.I.E.E.E. standards. Insulation resistance and dielectric strength shall meet requirements of these standards as well. Verify by field testing at City of New York facility required phase for new motor and assume full responsibility for motor's voltage and phase.
3. Reduction Unit: Motor shall be connected to a gear reduction unit which is separate from motor. Unit shall employ worm gears running in high grade oil. Output shaft shall be 3/4" diameter with an outboard bearing support. Connection of motor to gear reducer shall be with flexible coupling.
4. Clutch: Operator shall employ an adjustable, friction type, safety clutch which will provide protection for door, operator and obstruction, should door travel become restricted. Spring tension of clutch mechanism shall be adjustable by means of an adjustable nut and spring in order that proper slippage be obtained in starting door from rest. This would allow clutch to slip should movement of door be obstructed. Clutch shaft shall be supported with heavy duty spherical type bearings.
5. Brake: Operator shall employ a brake drum coupling assembly with solenoid of sufficient power to stop and hold door in any position.
6. Starter: Operator shall have an enclosed magnetic reversing starter with an overload protection interlock so that "open" and "close" contactor not be closed at same time. Starter shall be installed as an integral part of motor and shall be factory wired. In the event that starter is furnished separately, contractor supplying equipment shall bear expense for field installation and connection. Operator shall have a thermal overload protection device or a motor controlling device to protect motor and shall have a separate manual reset button, externally operated without removing electrical box cover. Overload and related control box shall be properly labeled to identify which overhead door this overload is connected to. For example:
 - a. Overload
 - b. Engine Overhead Door 1
7. Limit Switches: Operator shall have two (2) limit switches for automatically stopping motor at extreme "open" and "close" door positions. These switches shall be enclosed in a box mounted on operator.
8. Emergency and Normal Manual Operation



- a. To slow speed shaft of operating unit, a jaw disconnecting clutch shall be applied to release lever. A wire cable or heavy duty chain shall be attached and carried to a convenient point mounted on wall under electric operator. Door shall be released quickly from electric operation to emergency chain hoist operation. Provide two (2) rubber ball grips on cable or sash chain to facilitate quick and easy release. Ball grips shall be positioned to provide maximum leverage. Locate top ball grip 6'-3" above finished floor. The second rubber ball to be mounted in a position to slide under slot located in the chain keeper to keep unit in manual operation. See item "c" below.
 - b. Emergency and normal hand operation shall consist of an auxiliary geared chain hoist mounted integrally with operating unit. Hand chain shall extend to within 24 inches of floor. Hand chain shall have rust-resistant finish with chain links solid and welded. Hoist guard collar shall be rigidly secured to shaft by pinning through shaft.
 - c. Install a heavy duty steel angle (3/16" thick) locking bracket or hand chain keeper with a slot, steel lock pin and 3/16" lever for locking hand chain in position. Bracket slot shall accommodate a link from each hand chain run in addition to cable or sash chain release. Steel pin shall have a minimum length of 2-1/2" and shall be attached to bracket with a wire cable. A slot shall also be provided for release line to be held in position. This shall provide for hand operation of chain hoist unit.
 - d. Door shall be made available for hand operation by pulling release lever chain, disconnecting motor from door and engaging auxiliary chain hoist gears directly to door operating mechanism.
- B. Installation of door operator, etc.
1. Motor drive support: Motor drive equipment shall be supported by a heavy steel angle frame with frame braced to wall and ceiling. Operator shall be side mounted, independent of door track angle installation with a 8" minimum clear space (where available) provided between operator parts and horizontal track angle edge. Wall supports shall be mounted vertically below operator and diagonally braced with operator frame. Install cleat, hanger and diagonal bracing supports at other end of operator frame and above same.
 2. Connections to Door: New operating mechanism shall be directly coupled to overhead door's cross head shaft with a keyed, adjustable, cast iron coupling or heavy duty sprockets using #50 Roller Chain. Furnish 16 tooth # 50 sprocket on main shaft of door and 12 tooth # 50 sprocket on final output shaft of operator.
- C. Disconnect switch
1. Coordinate with Electrical trade to install and wire electrical disconnect switch in vicinity of electric operator mechanism. Disconnect switch shall be used to disconnect power to operator for its maintenance. Operator drive shaft shall be aligned with crosshead shaft of door.
- D. Control devices and accessories



1. Push Button Control Station
 - a. One heavy duty, 3-button control station to be provided on each jamb of the door opening (Total of 2 control stations per door. However, location depends on specific site conditions, which may dictate a different location. Station shall be of momentary contact type, push button control station with (3) buttons marked “Open”, “Close” and “Stop”. Locate on interior front wall, near vertical track angle. Mount (5) feet above floor and label per this specification.
 - b. Provide two-button control stations (one for each door). Coordinate with electrical trade.

2. Overhead door warning bell
 - a. Furnish a heavy duty, 4", 24-volt, weatherproof, slotted gong type, warning bell with weatherproof back box. Bell is to ring continuously unless door is fully opened or fully closed (includes both chain hoist and electrical operation.
 - b. Noise intensity of bell shall be cut in half by appropriate means.

- E. Safety reverse feature
 1. Provide at bottom-side of door an electric yellow safety edge to reverse downward motion of door upon hitting any obstacle. Safety edge shall be connected to electrical operator using a heavy-duty four (4) wire coiled cord. Reversing edge electrical circuit shall be provided with a “fail-safe” monitoring system, which shall notify personnel that edge has become inoperative. Upon detecting an edge failure, this module shall turn on an LED indicator. In addition, module shall automatically change the “down” control button from “MOMENTARY” contact to “CONSTANT” contact requiring that someone must remain at door, depressing button until door is closed. Upon detecting that edge has been restored or replaced, this module shall automatically turn off LED Indicator and return “down” control button to “MOMENTARY” contact.

- F. Photoelectric Eyes: omitted –do not provide.

- G. Door Buzzer System
 1. Where a pass door is required, provide and install a heavy-duty 24 volt, AC buzzer system with two (2) remotely located buzzers. Buzzers shall be located on apparatus floor and in dining area. Each time pass door is opened; a continuous buzzer will sound until door is closed.



2. Buzzers shall be vibrating, dust-proofed, heavy-duty, fully enclosed, adjustable volume type of mechanism. Intensity of buzzer can be adjusted.
 3. Transformer shall be a heavy-duty 120/24 volts, 50 watt.
 4. All other materials not specifically described but required for a complete and proper installation of all work in this Paragraph G shall be provided and installed by the Contractor and subject to approval of Commissioner. Magnetic contacts will not be accepted.
- H. Installation of Wiring, Conduits, Etc.
1. Conduit, Wiring, Etc.
 - a. Coordinate with electrical trade to install switches, relays, and other electrical materials required to interconnect and make the operator, switches, controls, bell and light system circuits, etc. operational.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where sectional overhead doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 MISCELLANEOUS WORK AT EACH DOOR

- A. Cycle Counter: Provide at each overhead door a non-resettable counter for each overhead door. Counter shall be located inside door control panel.
- B. Overhead Door Adjustments, Operations, Etc.
 1. Door shall be neatly installed in its proper position with fixed units firmly fastened in place and operating units adjusted to work properly and easily including disengagement mechanism.
 2. Door shall have minimum clearances necessary for operating without binding. Provide and install any additional hardware, equipment, devices, etc. that is



necessary for operation of door in accordance with New York City Building Code requirements mentioned herein. Adjust positioning of track angles as necessary.

3. Adjust tension of all springs as necessary for proper emergency chain hoist operation.
4. Electrical door operator and door component parts including warnings bells shall be adjusted to work properly. Tighten all set screws on various components of Units. Remove excess slack in roller chains. Adjust electrical limits as necessary to place each door into proper operation.
5. Lubricate track curvature.
6. Furnish and install an LED light to indicate that door safety edge is not working. Light shall be located above door control button. Above light, install a sign stating:

WARNING
IF LIGHT IS ON, OVERHEAD DOOR SAFETY EDGE IS NOT WORKING
CALL FOR EMERGENCY SERVICE IMMEDIATELY
NUMBER AS PROVIDED BY NYPD

7. Sign shall be 6" wide by 2 1/2" high. Letters shall be white color, 3/8" high, with a red background.
8. Provide and install name plates on two (2) and three (3) button stations, LED indicator, operator disconnect switch and overload button.
 - a. Nameplate shall read "Overhead Door #_____" and shall be made of engraved Bakelite material with 3/8" white letters on a red background.

3.4 START-UP

- A. Start-up services: Engage a factory-authorized service representative to perform start-up services and to instruct City of New York's maintenance personnel as specified below.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Instruct City of New York's maintenance personnel on procedures and schedules related to start-up and shutdown, troubleshooting, servicing, and preventative maintenance.
- D. Review data in maintenance manuals.
- E. Schedule instruction with City of New York giving at least 7 days advance notice.



3.5 DRILLING, CUTTING, PATCHING, ETC.

- A. Provide all drilling, cutting, patching and restoration required by the work, and restore any existing work damaged by installation. All work shall be restored to Commissioner's satisfaction. Any work which is inferior or unsatisfactory to Commissioner's judgment shall be removed and restored to the Commissioner's satisfaction.
- B. Restoration – If such drilling or cutting is done on finished surfaces of equipment structure, any marring of surface shall be made good by restoration or replacement by Contractor. Contractor shall be held responsible for restoration due to excessive cutting or drilling; and any damage to the building or its contents caused by Contractor or Contractor's workers.

END OF SECTION 08 36 13



SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Aluminum and glass curtain wall assemblies.
2. Glass and glazing in conjunction with the work of this Section.
3. Curtain wall insulation, fire separation, fire safing and smoke stop.
4. All necessary steel or aluminum members where required to support, strengthen and/or reinforce aluminum members.
5. Sealants, caulking, joint fillers, gaskets, fasteners, vents and weeps, weep tubes, bellows, closures, gutters, end dams, flashings, trim, as shown or as may be required in conjunction with the system or to joint the system to adjacent construction.
6. Anchors, inserts and insert setting diagrams, furnishing of inserts and insert setting diagrams, support brackets, reinforcing, bracing, stiffeners, flashing.
7. Shop drawings engineering calculations, erection drawings, samples and conformance test data.
8. Field check for water leakage.
9. Protection and cleaning, as defined herein.
10. Field measurements of adjacent and/or supporting construction and verification of existing conditions.

B. Related Sections

1. Section 07 21 00 "Thermal Insulation"
2. Section 07 92 00 "Joint Sealants"



3. Section 08 81 00 "Glass Glazing" for glazing other than in conjunction with the metal work of this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by manufacturer's documented performance criteria and field testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Glazed aluminum curtain walls shall withstand movements of supporting structure and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Engineering Services: Engineer glazed aluminum curtain walls, including comprehensive engineering analysis by a Professional Engineer licensed in the State of New York, including, but not limited to story drift, twist, column shortening, long term creep, using performance requirements and design criteria indicated.
- C. Design Wind Loads: Comply with 2008 New York City Building Code or ASCE-7, whichever is more stringent.
- D. Structural-Test Performance: Test according to ASTM E 330 as follows:
 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Deflection of Framing Members: At design wind pressure, as follows:
 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.



2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or 1/8 inch, whichever is smaller.
 3. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to two times the length of cantilevered member, divided by 175.
- F. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
- G. Story Drift: Accommodate design displacement of adjacent stories indicated.
1. Design Displacement: Coordinate with Commissioner.
 2. Test Performance: Meeting criteria for passing based on building occupancy type when tested according to AAMA 501.4 at 1.5 times the design displacement.
- H. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- I. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
1. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.
- J. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
 2. Test Interior Ambient-Air Temperature: 75 deg F.
 3. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
- K. Energy Performance: Glazed aluminum curtain walls shall have certified and labeled energy performance ratings in accordance with NFRC.
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.



2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.37 as determined according to NFRC 200.
 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.
 4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 65 as determined according to NFRC 500.
- L. Sound Transmission: Provide glazed aluminum curtain walls with fixed glazing and framing areas having the following sound-transmission characteristics:
1. Outdoor-Indoor Transmission Class: Minimum 30 when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- M. Dimensional Tolerances: Provide glazed aluminum curtain wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Submit Shop Drawings showing fabrication and installation of glazed aluminum curtain wall system including plans, elevations, sections, details of components, and attachments to other units of Work.
 1. For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by a Professional Engineer licensed in the State of New York responsible for their preparation.
- D. Submit samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- E. Submit cutaway sample of each vertical-to-horizontal intersection of system, made from 12-inch lengths of full-size components and showing details of the following:
 1. Joinery.
 2. Anchorage.
 3. Expansion provisions.



4. Glass and glazing.
5. Flashing and drainage.
- F. Submit welder certificates indicating that welders comply with requirements specified in "Quality Assurance" Article.
- G. Submit installer certificates signed by manufacturer certifying that installers comply with requirements in "Quality Assurance" Article.
- H. Submit product test reports from a qualified independent testing agency evidencing compliance of glazed aluminum curtain wall system with requirements based on comprehensive testing of manufacturer's current system.
- I. Submit test reports, calculations, computer analysis and other necessary data from a qualified independent inspecting and testing agency retained by the Contractor indicating compliance with performance requirements of glazed aluminum curtain wall system.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Commissioner's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.
- D. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing glazed aluminum curtain wall systems similar to those required for this Project and who is acceptable to manufacturer.
 1. Engineering Services: Engage a qualified professional engineer licensed in the State of New York to prepare or supervise the preparation of data for glazed aluminum curtain wall systems, including drawings, testing program development, test-result interpretation, and comprehensive engineering analysis that shows systems' compliance with specified requirements. Submit to Commissioner for review and approval.
- E. Source Limitations: Obtain each type of glazed aluminum curtain wall system from one source and by a single manufacturer.



- F. **Product Options:** Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight lines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, or in-service performance.
1. Do not modify intended aesthetic effects, as judged solely by Commissioner, except with Commissioner's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Commissioner for review.
- G. **Welding Standards:** Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."
1. Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.
- H. **Mockups:** Prior to installing glazed aluminum curtain wall system, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.
1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Commissioner.
 2. Notify Commissioner 7 days in advance of the dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Commissioner's approval of mockups before start of Work.
 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Approved mockups in an undisturbed condition may become part of the completed Work.
- I. **Preinstallation Conference:** Conduct conference at Project site. Review methods and procedures related to glazed aluminum curtain wall system including, but not limited to, the following:
1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 2. Review structural loading limitations.



3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required inspecting, testing, and certifying procedures.
5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 WARRANTY

- A. Manufacturer's Warranty: Submit a written warranty executed by the manufacturer agreeing to restore or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
1. Structural failures including, but not limited to, excessive deflection.
 2. Noise or vibration caused by thermal movements.
 3. Failure of system to meet performance requirements.
 4. Failure of operating components to function normally.
 5. Water leakage.
 6. Glazing breakage.
- B. Warranty Period: 10 years from date of Substantial Completion (except as noted below).
- C. Finish Warranty: Standard form in which manufacturer agrees to restore finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.



- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Wausau Window and Wall Systems; SuperWall or comparable product by one of the following:
1. Kawneer
 2. YKK America AP
 3. Or approved equal.

2.2 METALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
1. Sheet and Plate: ASTM B 209.
 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM A 1008.
 5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plats, and Bars: ASTM A 36.
 2. Cold Rolled Sheet and Strip: ASTM A 1008.
 3. Hot Rolled Sheet and Strip: ASTM A 1011.

2.3 FRAMING

- A. Framing Members: Extruded or formed aluminum framing members of thickness required and reinforced as required to support imposed loads.



1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
- B. Brackets and Reinforcements: Manufacturer's standard high strength aluminum with non-staining, non-ferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
1. Use self locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- D. Anchors: Three way adjustable anchors with minimum adjustment of 2" that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
1. Concrete and Masonry Inserts: Hot dip galvanized cast iron, malleable iron, or steel inserts complying with ASTM A 123, or ASTM A 153 requirements.

2.4 GLASS

- A. Glass shall be of the types and minimum thickness, as shown on the drawings and specified herein, and shall, in addition, meet the requirements of the following paragraphs.
- B. All glass shall be the manufactured product of one (1) company. All fabricated glass products shall be the fabricated and coated products of one (1) company. All glass shall be delivered to the site bearing the manufacturer's label, complete with glazing instructions where applicable.
- C. Insulating glass units shall be 1" thick (minimum), consisting of two lites of 1/4" (minimum) glass separated by desiccant filled metal spacers with welded, fused, soldered or bent corners and welded, fused or soldered splices or joints to provide 1/2" hermetically sealed and dehydrated spaces. Insulating glass shall be dual seal and certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGC) and tested in accordance with the following ASTM Test methods. Secondary seal on structural silicone glazed units shall be a special silicone edge seal certified for use in structural silicone glazing applications over the temperature range and structural loading as called for under the performance criteria section of this Specification.



1. ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.
 2. ASTM E 546-88 Standard Test Method for Frost Point of Sealed Insulating Glass Units.
 3. ASTM E 576-88 Standard Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- D. The lites comprising insulating glass units shall be annealed, heat strengthened, (or fully tempered where required to meet wind load or safety glazing requirements), as shown, specified, required, or recommended by the specified glass fabricator to ensure against heat breakage and to ensure adequate glass performance at the specified design pressures specified under the performance criteria herein.
- E. Glass shall conform to the requirements of ASTM C 1036. Heat strengthened and tempered glass shall conform to the requirements of ASTM C 1048. Tempered glass shall also conform to ANSI Z97.1-1975. All heat strengthening and tempering shall be by the horizontal process, and processed in such a manner as to have all roller distortion in a horizontal direction as installed on the building.
- F. All fully tempered glass shall be heat soaked (checked) at glass surface temperatures of not less than 400 deg. F. for 4 hours, if this procedure is available from the glass manufacturer. Glass manufacturer shall submit for approval their proposal for meeting this requirement.
- G. Where glass manufacturer cannot ensure adequate structural performance of insulating glass units, based upon combination of inner/outer lite, assume outer lite alone must satisfy structural requirements. Method of installation must be in accordance with the manufacturer's published literature, as well as the latest standards of the FGMA and SIGMA. Method of installation shall make provision to weep all sill glazing rabbets.
- H. Contractor shall provide certification from glass producer/fabricator that glass producer/fabricator has reviewed all glazing details and thicknesses and finds same suitable for the purpose intended in accordance with these specifications. This shall include a written wind load and thermal stress analysis showing a probability of failure of no greater than 8 lites per thousand for conventional glazing and 4 lites per thousand for structural silicone glazing at the design loads and local climatic thermal conditions.
- I. Glass producer/fabricator shall make regular inspections (maximum interval semi-monthly) of glazing work in progress at the point of glazing for both mock-up and job production units to verify that glazing is proceeding in accordance with any recommendations. Glass producer/fabricator shall attend the mock-up test at no additional cost to the City of New York.
- J. Insulating glass units shall be installed in such manner as to adequately drain the glazing rabbet in a manner, as approved in writing, by the insulating unit glass manufacturer.



- K. Contractor shall include in the design provision for reglazing vision lites with access from the interior except for structurally glazed lites which shall be reglazed from the exterior and spandrel lites with access from the exterior only. Mock-up shall include lites shop glazed in the initial installation as well as field glazed in the replacement mode.
- L. Glass deflection at full design load shall be limited to the lesser of $L/100$ or $3/4"$. In event specified glass cannot meet these requirements, Contractor shall submit calculations establishing anticipated deflections and reduction in glass bite as a consequence of deflections, along with the drawings. Submittal shall include a statement from glass manufacturer/fabricator that reduction in glass bite will not result in a reduction in load resistance capacity, an increase in breakage probability and that all specified warranties shall remain in effect.

2.5 GASKETS/WEATHERSTRIPPING

- A. All gaskets/weatherstripping shall be neoprene, except where used in contact with a silicone sealant. In contact with silicone sealants, gaskets and spacers shall be preformed heat cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended or equal, as recommended by the sealant manufacturer and approved by the Commissioner. All gaskets/weatherstripping/spacers shall have continuous mechanical engagement to framing members; adhesive attachment is not acceptable. All weatherstrips and gaskets shall be continuous with vulcanized/ molded corners where possible.
- B. Sponge gaskets/weatherstripping/spacers shall be extruded black neoprene or silicone rubber (or equal as provided for in 2.4 A) with a hardness of $40 + 5$ durometer Shore A and conform to ASTM C 509-79 (for neoprene). Sponge gaskets shall be compressed 20% to 35% in the final installed position.
- C. Dense gaskets/weatherstripping shall be extruded black neoprene conforming to NAAMM SG-1-70 or silicone rubber (or equal as provided for in 2.04 A) with a hardness of $75 + 5$ durometer Shore A for hollow profiles and $60 + 5$ for solid profiles.

2.6 SEALANTS (NON-STRUCTURAL)

- A. All joints, which are sealed with sealant as part of the fabrication or erection procedure, shall be sealed with an approved butyl (concealed) or low modulus silicone (exposed or concealed) sealant in color to match the adjoining surfaces or as may be required by the Commissioner. All perimeter sealant (metal to adjacent construction) shall be low or medium modulus silicone sealant.
- B. In using specified sealants, strictly observe the printed instructions of sealant manufacturer regarding joint size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary, and sealant manufacturer certifies that the use thereof will reduce its performance. Sealant shall not be applied when substrates are wet or when the temperature is below 40 deg. F.



- C. Care shall be exercised to ensure against "Three Surface Adhesion." Bond breakers shall be provided where necessary.
- D. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended, compatible with and will not stain the surfaces with which they are in contact. Statement as to compatibility, adhesion sufficiency and non-staining shall be accompanied by actual test results on production substrates performed in accordance with applicable ASTM procedures.

2.7 SEALANTS (STRUCTURAL)

- A. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.
- B. All components which are adhered with a structural silicone sealant/adhesive as part of the fabrication, glazing or erection procedure, shall be sealed/adhered with an approved structural silicone.
- C. In using specified sealants, strictly observe the printed instructions of sealant manufacturer regarding joint size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary. Sealant shall not be applied when substrates are wet or when the temperature is below 40 deg. F. Units shall not be moved until structural silicone seal has achieved full cure.
- D. Care shall be exercised to ensure against "Three Surface Adhesion." Bond breakers shall be provided where necessary.
- E. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and tested all contact surfaces, and finds same suitable for use with proposed sealant, the purpose intended and compatible with the surfaces with which they are in contact. Sealant manufacturer's certification shall include the following based upon tests performed on production run materials:
 - 1. Test data of adhesion to production samples of metal and glass, tested in accordance with ASTM C 794.
 - 2. Compatibility statement that the materials in contact with the sealant such as gaskets, spacers, setting blocks, are compatible with the sealant after 21 days exposure to ultra violet, 2000 - 4000 (micro watt u.v. radiation).
 - 3. Stress statement that when exposed to the specified wind load the stress in the silicone sealant of dimensions shown does not exceed 20 psi with a safety factor of 6:1.



- F. Where silicone bonds to a metal or glass surface, the weakest element in the line of stress must have a minimum strength of 120 psi. For each combination of substrates submit report from an independent laboratory for tests performed in the following manner:
1. Assemble and fully cure a minimum of 6 samples using actual substrates and a minimum sample length of 5".
 2. Subject sample to a tensile load such that nominal stress on silicone is 20 psi, hold for one minute and remove load. Repeat for additional loadings, increasing nominal silicone stress by 20 psi with each successive loading. Continue until failure occurs or until 200 psi is successfully applied.
 3. All 6 samples must successfully withstand at least 120 psi. Report maximum stress and mode of failure. If one or more samples do not meet this criteria, revise failed element and repeat tests with 6 new samples. Repeat until all 6 samples are successfully tested.
 4. Testing shall be performed in such a manner as to establish stress and safety factor over the temperature range described herein.
 5. Prepare an outline for a quality assurance program for evaluation of adhesion and other physical attributes of sealants and submit to Commissioner for review and approval.
 6. Program shall cover both initial testing of components for sealant adhesion/compatibility, etc., and also random testing of production run materials, etc. Include testing at full negative design pressure, one unit per one hundred units manufactured for the project. Also include methods which will be employed to monitor sealant application to ensure full sealant contact. No sealant work shall be performed prior to approval of program.

2.8 GLAZING BLOCKS

- A. Provide setting blocks at the sill quarter points of all glass lites. Setting blocks shall be black dense neoprene or heat cured silicone rubber with a hardness of 80 to 90 durometer, Shore A, a minimum length of 4", and a minimum width, which will permit full support of both panes of glass in an insulating glass unit or a monolithic unit no matter how positioned within the glazing rabbet.
- B. Shims used in conjunction with setting blocks must be of the same materials, hardness, length and width as the setting blocks.
- C. Provide side blocks within the upper half of both jambs of all glass lites. Side blocks shall be black dense neoprene or heat cured silicone rubber with a 60 to 70 durometer, Shore A, or as recommended by the selected glass manufacturer. Provide 1/8" clearance between block and bearing surface.



2.9 MISCELLANEOUS MATERIALS

- A. Provide straps, plates and brackets, built-in inserts, as required for support and anchorage of the fabricated items to adjacent surfaces.
- B. Where steel reinforcement of units is required for strength or other unavoidable necessity and concealed within (encased) in aluminum sections or employed in potentially wetted areas, hot dip galvanize the pieces after fabrication with 2.0 ounce zinc coating, complying with ASTM A 123. All other steel reinforcement shall be coated with two (2) heavy coats of zinc rich primer in differing colors.
- C. Slip Joint Linings/Sleeves: Provide stainless steel sleeve spacers and/or suitable bearing pads, as required, to ensure free movement between surfaces where expansion and deflection movements are intended. Provide polystyrene shims or pads or equivalent plastic units of sizes and thicknesses (minimum 1/16") recommended by the manufacturer to permanently prevent "freeze up" of joints. All sleeves, spacers, bracing pads and shims must be incombustible and rated by UL.
- D. Flashing required within the system shall be 26 ga. stainless steel.
- E. Flashing required to join the system to adjacent construction shall be 26 ga. stainless steel.

2.10 INSULATION AND FIRESAFING

- A. Provide thermal and fire separation insulation where shown and where required, with a minimum thickness of 4" (or thicker if required to meet specified thermal performance) and the foil vapor barrier (permeability not to exceed 0.020 Perms) at interior surface and all edges. Provide insulation and "fire wrap" at mullions and/or stiffeners as required to meet overall thermal and condensation resistance requirements and as required by 2008 New York City Building Code.
- B. Tape and seal all joints in vapor barrier and along edges and supports to ensure continuous vapor barrier.
- C. Apply insulation utilizing welded or screw applied impaling pins and retaining clips. Adhesive attachment will not be accepted.
- D. Provide 5" thick (minimum) insulation at full perimeter at each floor level between floor edge and curtain wall to meet requirements of 2008 New York City Building Code. Provide hourly rating as required by 2008 New York City Building Code. Seal all edges with an approved fire resistant sealant to provide a continuous fire/smoke barrier.
- E. Insulation and firesafing shall be suitably isolated/separated from direct contact with spandrel glass.



2.11 THERMAL BREAK

- A. Provide thermal break or thermally improved construction, complying with the requirements of these Specifications and which have been in service on comparable installations for no less than three (3) years. Submit data to prove structural sufficiency over full exterior thermal range specified, and anticipated wind loading. In the event a structural thermal break is employed, manufacturer shall establish structural properties over full thermal range.

2.12 FABRICATION

- A. General: Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- E. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld before finishing components. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to GANA's "Glazing Manual."
- G. Glazing Pockets: Provide minimum clearances for thickness and type of plastic sheet indicated according to plastic sheet manufacturer's recommendations.
- H. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- I. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.



1. Install glazing according to approved Shop Drawings.
 - J. All machining, cutting and welding shall be done before finish is applied.
- 2.13 ALUMINUM FINISHES
- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
 - B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 - C. High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.
 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Colors
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Lintec "Bone White" LT609-70 or comparable product by one of the following:
 - 1). PPG
 - 2). Valspar
 - 3). Or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete



or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- D. Install framing members plumb and true in alignment with established lines and grades.
- E. Install factory-assembled frame units plumb and true in alignment with established lines and grades.
- F. Install column covers plumb and true in alignment with established lines and grades.
- G. Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.
 - 1. Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- H. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
- I. Install glazing according to approved Shop Drawings.
- J. Install sealant according to approved Shop Drawings. Comply with requirements of Section 07 92 00, "Joint Sealants."
- K. Install firesafing in locations indicated. Comply with requirements of Section 07 84 13, "Penetration Firestopping."
- L. Erection Tolerances: Install glazed aluminum curtain wall system to comply with the following maximum tolerances:
 - 1. Plumb: 1/16" in 10 feet; 1/8" in 40 feet.
 - 2. Level: 1/16" in 20 feet; 1/8" in 40 feet.
 - 3. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16"; where a reveal or protruding element separates aligned surfaces by less than 2", limit offset to 1/4".
 - 4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8" in 12 feet; 1/4" over total length.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent testing agency to perform testing indicated.



- B. Static air infiltration test(s) as well as the static pressure water test(s) shall be performed on 100 sq feet to determine if curtain wall meets performance requirements specified herein under Article 1.3.
- C. Test for water infiltration per AAMA 501.2. Test within the first 10% of work complete, area to be a minimum of 100 SF of wall and including a perimeter where CW adjoins masonry construction. Interior finishes must not interfere with observation of test area or be removed from test area. Not appropriate for operable windows and doors.
 - 1. This test (AAMA 501.2) shall be performed infield on new construction.

END OF SECTION 08 44 13



SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Composite frame fixed and casement windows.
2. Miscellaneous insulation at window frames.
3. Anchors, hardware and accessories including trim pieces and panning.

- B. Related Sections

1. Section 07 92 00 "Joint Sealants"
2. Section 08 81 00 "Glass Glazing"

1.3 PERFORMANCE REQUIREMENTS

- A. Windows must conform to the "Voluntary Specification for Aluminum Prime Windows & Sliding Glass Doors" as published by ANSI/AAMA 101/I.S.2-97 unless more stringent requirements are specified. Windows must conform to minimum standards of AW60 for projected, casement and fixed windows.

- B. Performance and Testing: Except as otherwise indicated, comply with air infiltration tests, water resistance tests and applicable load tests specified in ANSI/AAMA 101/I.S.2-97 for type and classification of window units required in each case.

1. Testing: Where manufacturer's standard window units comply with requirements and have been tested in accordance with specified tests, provide certification by manufacturer to the Commissioner showing compliance with such tests; otherwise, perform required tests through an AAMA-accredited testing laboratory or agency, and provide certified test results to the Commissioner.
2. Test reports must be not more than four years old.
3. Sample submitted for tests will be manufacturer's standard construction and whose overall dimensions must be at least the lay-out size window and window/door unit



required for this Project. Sequence of test may be optional between manufacturer and the testing laboratory except that in all cases, air infiltration test must be performed before water resistance test. Sash in sample will contain the approximate configuration as that of windows to be tested.

4. To evaluate testing and measure product performance, conduct testing on manufacturer's standard product glazed with type of glazing material specified herein.
- C. Conduct a thermal transmittance test and a condensation resistance test according to AAMA 1503-04, "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections." Use standard test conditions as specified in Section 9.1 of the 1503.1-04. Windows must meet the following minimum criteria:
1. Condensation Resistance Test (CRF)
 - a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1502.7.
 - b. Condensation Resistance Factor (CRF): Not less than 50.0 for glass and 55.0 for frame.
 2. Thermal Transmittance Test (Conductive U-Value)
 - a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1503.0.
 - b. Conductive thermal transmittance (U-value): Not more than 0.60 BTU/hr/sf/deg. F.
- D. Provide anchorage of window to building substrate to withstand pressure or suction winds loads per requirements of the 2008 New York City Building Code but not less than 30 psf.
- E. Life Cycle Testing: When tested in accordance with AAMA 910-93, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage which would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests must not exceed the primary performance requirements specified.
- F. Fabricate and install window to allow for thermal movement of materials when subject to a temperature differential from -30 deg. F. to +180 deg. F. without damage of any finish.
- G. Take field measurements of existing openings prior to submitting shop drawings and show same on shop drawings for each opening. Note that the Contract Drawings show general locations and sizes of windows, but the Contractor remains responsible for all field measurements, quantities, etc.



1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings
 - 1. Show in detail and fully indicate the location and the quantities of all the work, the kind, finish, size, section of each unit, overall and detail dimensions, factory and field joint locations, arrangements and details, location and detail of each piece of anchorage, flashings, supporting construction provisions for the work of others.
 - 2. Show all surrounding conditions on elevations and details, including steel, concrete, masonry, lintels, block, and anchorage; all correctly dimensioned.
 - 3. Shop drawings of building elevations must be at scale of 1/8" = 1'-0", or larger. Other shop drawings may be at a scale that is normal to trade, or larger if required by the Commissioner.
 - 4. Contract drawings may not be used (reproduced, enlarged, reduced, etc.) by Subcontractor for shop drawings.
 - 5. Shop drawings also must fully demonstrate all requirements respecting the manufacture, finishing, handling, storage, carting sequence and erection of all materials specified herein.
 - 6. Show joinery techniques, provision for horizontal and vertical expansion, drainage and weep systems, glass and metal thicknesses and framing member profiles.
 - 7. Identify all materials, including metal alloys, glass types, fasteners, and glazing materials. Identify all shop and field sealants by product name and locate on drawings. Glazing details must be at full size scale.
 - 8. Show dimensioned position of glass edge relative to metal rabbet.
 - 9. Show attachments of window assemblies to adjoining construction and location of all work; kind, finish and size of frames, overall and detail dimensions, location and detail of each anchorage; supporting and adjoining construction; provision for the work of other trades; and all other required information.
 - 10. Contractor must verify all measurements of existing window openings in the field before commencing fabrication.
 - 11. Any proposed deviations from work shown on the Contract drawings must be indicated and so identified on shop drawings for the Commissioner's review.
- C. Samples
 - 1. Submit 12" long sample of extrusion with specified finish.
 - 2. Full size corner section of all types of aluminum frame, showing construction, glass and finishing - 12" x 12".



3. All fasteners, straps, hardware, locks and keys, sealant, etc.
 - D. Submit certified test results as required herein.
 - E. Warranty as noted in Article 1.8.
- 1.5 QUALITY ASSURANCE
- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Protection
 1. Pack, load, ship, unload, store and protect materials in a manner which will avoid abuse, damage and defacement in accordance with the recommendations contained in the AAMA Aluminum Curtain Wall Manual #10 entitled "Care and Handling of Architectural Aluminum From Shop to Site."
 2. Remove all paper type wrappings and interleavings that are wet or which could become wet when unloading materials.
 3. Store inside structure in space designated by the City of New York.
 4. Stack vertically or on edge so that water cannot accumulate on or within materials using wood or plastic shims between components to provide water drainage and air circulation.
 5. Cover materials with tarpaulins or plastic hung on frames to provide air circulation and prevent contaminants from contacting aluminum.
 6. Keep water away from stored assemblies.
 7. The Contractor is responsible for taking the steps necessary to protect the materials from careless handling of tools, weld splatter, acids, roofing tar, solvents, abrasive cleaners, and other items that could damage window components and finish.
- 1.7 MANUFACTURER'S REPRESENTATIVE
- A. Contractor shall require representative of manufacturer of the windows to provide field instructions and supervision of the installation of the windows.
 - B. Contractor shall require the manufacturer's representative to make sure that the subcontractor's workmen are fully instructed and experienced in the handling and application of all the materials, and shall see that all the materials are correctly installed.
 - C. Upon completion of the installation, the Contractor shall submit to the Commissioner in written form certification that the representative of the manufacturer of the windows has supervised the work of this Section and that all windows are correctly installed.



1.8 WARRANTY

- A. Aluminum Windows and Related Materials: Manufacturer's ten (10) year warranty on materials and workmanship, including finish on aluminum and on glass and glazing.

PART 2 PRODUCTS

2.1 WINDOWS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Wausau Window and Wall Systems; 2250i-XP INvent PLUS Inswing Casement Windows and Fixed Windows or comparable product by one of the following:

1. Kawneer
2. Graham
3. Or approved equal.

2.2 PROJECTED, FIXED AND CASEMENT WINDOWS

- A. Aluminum Windows and Components

1. Extruded aluminum prime billet 6063-T5 alloy, conforming to ASTM B 221.
2. Aluminum sheet alloy 3003-H14, conforming to ASTM B 209.
3. Minimum principal window member wall thickness 1/8".
4. Minimum frame and vent depth, front to back: 3-1/2". Vent to be flush with frame.
5. Maximum exposed metal sightlines of main frame members: 2" at all members except 3" at horizontal intermediate between fixed and operable areas.
6. Glass plane must be recessed 1" from exterior plane of window members. Framing members must possess a sloped profile duplicating an existing exterior putty glazed steel window profile.
7. There may be no change in exterior sightlines between fixed and operable units including spandrel areas.
8. Vent sections must be tubes.

- B. Hardware - General

1. All steel components 300 Series stainless steel (SS) (except roto-operator arms) i.e. - keepers, fasteners, hold open arms, tracks, etc.
2. All aluminum components 6063-T5 (T6) or 6105-T6.



3. Locking handles and cases, white bronze.
 4. Hardware members bridging frame or vent thermal barrier to be nylon or suitable low conductivity, non-metallic material.
- C. Thermal-Break, Frame and Vent: Factory poured in place polyurethane into prefinished cavity in manufacturer's plant providing minimum 3/8" separation.
- D. Weatherstripping: Extruded sponge neoprene meeting ASTM C509.
- E. Glass and Glazing: Shop glaze, see Section 088100, Glass Glazing, for material description.
- F. Fabrication
1. General
 - a. Finish, fabricate and shop assemble frame and sash members into complete windows under responsibility of one manufacturer.
 - b. No bolts, screws or fastenings to bridge thermal barriers or impair independent frame movement.
 2. Casement Ventilator: Miter all corners and mechanically stake over solid aluminum, corner block minimum 1/4" thick, set and sealed in epoxy leaving hairline joinery, then seal weathertight. Joinery methods must not discolor finish or be unsightly.
 3. Main Frame Members: Miter all corners and continuously weld along unexposed surfaces so as not to affect the structural or thermal integrity of the thermal barrier, then seal weathertight.
 4. Weatherstripping
 - a. Two rows (both inner and outer overlap contacts) of extruded neoprene meeting ASTM C 509 in extruded races about perimeter of operating sash.
 - b. Securely stake and join at corners.
 5. Glass Drainage: Ensure that water will not accumulate and remain in contact with the perimeter areas of sealed insulating glass.
 6. Hardware
 - a. Hinges
 - 1). Provide each operating sash with a minimum of two extruded aluminum, three knuckle hinges with stainless steel pins. Provide windows over 4'-4" in height with an intermediate hinge.
 - 2). Attach the hinge to both the frame and sash with concealed fasteners. The hinge must match the window.
 - b. Locks



- 1). Provide each operating sash with a minimum of one die cast euro-style locking handle up to a ventilator height of 4'-0" and two locking handles on vents over 4'-0" high.
- 2). Provide all locking hardware with a stainless steel strike backed up with an extruded aluminum leg a minimum of .125" in thickness. Locking directly against aluminum, will not be accepted.
- c. Riser Blocks: Equip each operating vent with a nylon riser block at the sill.

2.3 FINISH OF ALUMINUM

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Colors
 - a. Clerestory Windows (1st floor):
 - 1). Interior: Benjamin Moore "Black Panther" 2125-10 or comparable color by Sherwin Williams, PPG Paints or approved equal.
 - 2). Exterior: Match Benjamin Moore "Black Panther" 2125-10 or comparable color by Sherwin Williams, PPG Paints or approved equal.
 - b. Casement Windows (2nd floor):
 - 1). Interior: Match Lintec "Bone White LT 609-70 or comparable color by Sherwin Williams, PPG Paints or approved equal.
 - 2). Exterior: Match Benjamin Moore Whale Gray or comparable color by Sherwin Williams, PPG Paints or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Use only skilled tradesman with work done in accordance with approved Shop Drawings and specifications.
- B. Plumb and align window faces in a single plane for each wall plane and erect windows and materials square and true adequately anchored to maintain positions permanently when subjected to normal thermal and building movement and specified wind loads.
- C. Adjust windows for proper operation after installation.



- D. Furnish and apply sealants to provide a weathertight installation at all metal-to-metal joints and intersections of frames and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.
- E. Insulate aluminum from direct contact with steel, masonry, concrete, or non-compatible materials by bituminous paint, zinc chromate primer, or other suitable insulation material.
- F. Install blanket insulation behind aluminum covers, panning and trim to ensure thermally insulated seal.

3.3 ADJUSTING AND CLEANING

- A. After completion of window installation, inspect, adjust, and put windows into working order. Leave windows clean, free of labels, etc.
- B. Replace glass that is broken, damaged, cracked, or permanently stained.
- C. Perform final cleaning of finish in accordance with AAMA 610.1.

END OF SECTION 08 51 13



SECTION 08 62 00

UNIT SKYLIGHTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Modular skylights
- B. Related Sections
 - 1. Section 07 52 00 "Modified Bituminous Membrane Roofing"
 - 2. Section 07 62 00 "Sheet Metal Flashing and Trim"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product data for each type of skylight specified, including details of construction relative to materials, dimensions of individual components, profiles, finishes, and glazing light transmission and thermal characteristics.
- C. Shop drawings showing fabrication and installation of skylights, including plans, elevations, sections, details of components, and attachments to other unit of Work.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Installer Qualifications: An entity meeting the requirements of DDC General Conditions Section 014000 1.7/C/1.
- C. Manufacturer Qualifications: Manufacturer meeting the requirements in DDC General Conditions Section 014000 1.7/C/5.

1.5 PERFORMANCE REQUIREMENTS

- A. Skylight shall withstand dead and live loads caused by pressure and uplift of wind acting normal to plane of roof as tested in accordance with ICBO Evaluation Service



Criteria AC-17 to a download pressure of 190 psf and 100 psf uplift as measured in accordance with ANSI/ASTM E 330.

- B. Per NY energy code 2010:
 - 1. U-factor assembly: 0.60 maximum.
 - 2. SHGC assembly: 0.40 maximum.
- C. Air Infiltration: Provide unit skylights with maximum air leakage through assembly of 0.2 cfm/sq. ft. when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft.
- D. Water Penetration: Provide unit skylights that do not evidence water penetration through assembly when tested according to ASTM E 331 at a zero static-air-pressure difference across unit.

1.6 WARRANTY

- A. Skylight Warranty: Provide written warranty signed by manufacturer, agreeing to restore or replace work that exhibits defects in materials or workmanship and guaranteeing weathertight and leak-free performance. "Defects" is defined as uncontrolled leakage of water and abnormal aging or deterioration.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Finish Warranty: Provide written warranty signed by manufacturer agreeing to restore or replace work with finish defects. "Defects" is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
 - 1. Warranty Period for Fluoropolymer Finish: 10 years from date of Substantial Completion for color and film integrity.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, provide Modular Fixed VMZ Longlight skylights as manufactured by Velux America Inc. or equivalent product of Bristolite, Wasco, or an approved equal acceptable to the Commissioner.

2.2 MATERIALS

- A. Frame and sash constructed of protruded composite material consisting of 80% glass fiber and 20% polyurethane, NCS-S0500-Nm RAL 9003, aluminum cap, Granite Grey color.
 - 1. Interior surface treated with white paint in color NCS S0500-N, gloss 30 (nearest RAL color 9003) When connecting two modules, the visible sash profile will measure 55 mm with a 10 mm dark grey shadow groove in the middle.



2. Exterior cladding surface is covered with extruded aluminum, coated with scratch resistant powder lacquer granite grey Akzo Nobel "Noir 2100 Sable" (60-120 my), PPG, Valspar or approved equal.

B. Flashings

1. Type: Prefabricated, modular standard flashings top, sides and bottom produced to fit the individual skylight modules.
2. Materials: Aluminium, grey painted
3. Surface: Powder coated polyamide polyester lacquer, NCS S 7500-N; RAL 7043, 1mm thickness

- C. Pane Construction:** Insulating glass unit 34mm IGU 8mm outer toughened glass, 20mm cavity- Argon gas-filled, Low E on cavity side, 6.76mm inner laminated float pane- consisting of 2 layers of 0.36mm interlayer foil.

- D. Hardware:** Manufacturer's standard.

- E. Motor Operator:** Manufacturer's standard electric motor and remote control.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
- B. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- C. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces. ASTM C 920; Type S; Grade NS; Class 25; and Uses NT, G, A, and (as applicable to joint substrates indicated) O.

2.4 FINISH FOR ALUMINUM

- A. Fluoropolymer, Two-Coat Coating System: Manufacturer's standard two-coat thermocured system, complying with AAMA 2605.2, composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene resin by weight; complying with AAMA 605.2.

1. Colors 2nd floor, Interior

- a. Basis-of-Design Product: Subject to compliance with requirements, provide Lintec "Bone White" LT609-70 or comparable product by one of the following:
 - 1). PPG
 - 2). Valspar
 - 3). Or approved equal.



2.5 FABRICATION

- A. General: Factory-assembled unit consisting of specified glazing, extruded aluminum glazing retainer, gasketing, inner frame designed to mount on separate curb, and self-contained flashing.
- B. Curb: Nominal 1-1/2-inch-thick treated wood curbs with cants or formed flashing flange to receive roof flashing and counterflashing. Wood to meet requirements of Section 062000 Finish Carpentry.
- C. Condensation Control: Fabricate skylight units with integral internal gutters and non-clogging weeps to collect and dispose of condensation.
- D. Thermal Break: Fabricate skylight units with thermal barrier separating interior metal framing from materials exposed to outside temperature.
- E. Glazing Gaskets: Manufacturer's standard glazing system of EPDM or neoprene, closed-cell sponge neoprene, or EPDM, or of partially vulcanized butyl tape or liquid-applied elastomeric sealant.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. General: Conform with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive skylight units. Coordinate with installation of vapor barriers, roof insulation, roofing, and flashing as required to assure that each element of the work performs properly and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
 - 1. Except as otherwise indicated, install roof skylights according to construction details of "NRCA Roofing and Waterproofing Manual."
- B. Isolation: Where metal surfaces of units are to be installed in contact with incompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide another permanent separation.
- C. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- D. Cap Flashing: Where cap flashing is required as component of the skylight, install to provide an adequate waterproof overlap with roofing or roof flashing (as counterflashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.



3.3 ADJUSTING, CLEANING AND PROTECTION

- A. Lubricate hardware and moving parts. Adjust operating sash, operators, and accessories for a tight fit at contact points and for smooth operation and weathertight closure.
- B. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
- C. Clean exposed metal and glass surfaces according to manufacturer's instructions. Touch up damaged metal coatings.
- D. Clean and polish glazed skylight units, inside and out, not more than 5 days prior to date of substantial completion.

END OF SECTION 08 62 00



**Department of
Design and
Construction**

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SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.

1. Door hardware for steel (hollow metal) doors.
2. Door hardware for aluminum doors.
3. Door hardware for wood doors.
4. Door hardware for other doors indicated.
5. Keyed cylinders as indicated.

B. Related Sections:

1. 06 20 00 Finish Carpentry.
2. 08 44 13 Glazed Aluminum Curtain Walls
3. 08 11 13 Hollow Metal Doors and Frames.

C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

1. Builders Hardware Manufacturing Association (BHMA)
2. NFPA 101 Life Safety Code
3. NFPA 80 -Fire Doors and Windows
4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
5. UL10C – Positive Pressure Fire Test of Door Assemblies
6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware

D. Intent of Hardware Groups

1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.

1.3 SUBMITTALS:

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Special Submittal Requirements: Coordinate submittals of this Section with related Sections to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit 6 copies of catalog cuts with hardware schedule.
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
 - 1. List groups and suffixes in proper sequence.
 - 2. Completely describe door and list architectural door number.
 - 3. Manufacturer, product name, and catalog number.
 - 4. Function, type, and style.
 - 5. Size and finish of each item.
 - 6. Mounting heights.
 - 7. Explanation of abbreviations and symbols used within schedule.
 - 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
 - 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Commissioner)
 - 1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 - 2. 3 samples of metal finishes
- G. Contract Closeout Submittals: Comply with DDC General Conditions including specific requirements indicated.
 - 1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.



- b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
2. Copy of final hardware schedule, edited to reflect, "As installed".
 3. Copy of final keying schedule, to be approved by client prior to finalization.
 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
5. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Commissioner in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Commissioner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with DDC General Conditions.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

- B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

- A. Coordinate hardware with work of other trades. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

- A. Manufacturer's Warranty:
 - 1. Closers: Ten years
 - 2. Exit Devices: Three Years
 - 3. Locksets & Cylinders: Three years
 - 4. All other Hardware: Two years.

1.8 BUILDING USERS' INSTRUCTION:

- A. Instruct building personnel in operation and maintenance of hardware units.

1.9 SERVICE

- A. Service Materials
 - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

<u>Item:</u>	<u>Basis of Design</u> <u>Manufacturer:</u>	<u>Additional:</u>
Hinges	Stanley	Bommer, Hager, or approved equal
Offset Pivot Set	Rixon	LCN, Dorma, or approved equal
Locksets	Corbin Russwin	Schlage, Yale, or approved equal
Cylinders	Corbin Russwin	Schlage, Yale, or approved equal
Exit Devices (Entry Door)	Van Duprin	Falcon, Stanley, or approved equal
Exit Devices (others)	Adams Rite	Falcon, Stanley, or approved equal
Closers	Norton	Stanley, LCN, or approved equal



Floor Closers, Pivots	Dorma	Rixon, Dorma, or approved equal
Magnetic Locks	Dorma	Norton, Allegion or approved equal
Power supply	Dorma	Norton, Allegion or approved equal
Push/Pull Plates	Burns	Rockwood, Trimco, or approved equal
Push/Pull Bars	Burns	Rockwood, Trimco, or approved equal
Protection Plates	Burns	Rockwood, Trimco, or approved equal
Door Stops	Rockwood	Burns, Trimco, or approved equal
Kick-Down Floor Stop	Rockwood	Stanley, Burns or approved equal
Threshold & Gasketing	Reese	National, Zero, or approved equal
Kick Plates	Trimco	Allegion, Rockwood or approved equal
Key Control Cabinet	Lund	Barska, Kekab, or approved equal

2.2 MATERIALS:

A. Hinges:

1. Template screw hole locations
2. Minimum of 2 permanently lubricated non-detachable bearings
3. Equip with easily seated, non-rising pins
4. Sufficient size to allow 180-degree swing of door
5. Furnish hinges with five knuckles and concealed bearings
6. Provide hinge type as listed in schedule.
7. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
8. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
9. UL10C listed for Fire

B. Offset Pivot Sets

1. Approved for exterior and interior applications.
2. Rated for weight up to 650lbs.
3. Rated for door width up to 4'-0" width.
4. Heavy weight pivot set.
5. Must allow for 180 degree door swing, trim permitting.

C. Mortise Type Locks and Latches:

1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C
2. Fit ANSI A115.1 door preparation
3. Functions and design as indicated in the hardware groups
4. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
5. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
6. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
7. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
8. Provide sufficient curved strike lip to protect door trim



9. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
10. Lock shall have self-aligning, thru-bolted trim
11. Levers to operate a roller bearing spindle hub mechanism
12. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
13. Spindle to be designed to prevent forced entry from attacking of lever
14. Provide locksets with 7-pin removable and interchangeable core cylinders
15. Each lever to have independent spring mechanism controlling it
16. Core face must be the same finish as the lockset
17. Provide (5) keys per cylinder
18. Provide a biting chart from manufacturer showing depth of cuts of all keys for replacement purposes

D. Exit Devices shall:

1. Tested and approved by BHMA for ANSI 156.3, Grade 1
2. Provide a deadlocking latchbolt
3. Non-fire rated exit devices shall have cylinder dogging.
4. Touchpad shall be “U” style for entry door and “T” style for all others.
5. Exposed components shall be of architectural metals and finishes.
6. Lever design shall match lockset lever design
7. Provide strikes as required by application.
8. Fire exit devices to be listed for UL10C
9. UL listed for Accident Hazard
10. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
11. Provide vandal resistant or breakaway trim

E. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.
4. Provide (5) keys per cylinder
5. Provide a biting chart from manufacturer showing depth of cuts of all keys for replacement purposes

F. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. The sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 in (75 mm) from the latch, measured to the leading edge of the door.
3. The maximum force for pushing or pulling open a door shall be as follows:



- a. Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.
 - b. Other doors:
 - i. exterior hinged doors: 8.5 lbf
 - ii. interior hinged doors: 5 lbf (22.2N)
 - iii. sliding or folding doors: 5 lbf (22.2N)
 4. If automatic door closer is used it shall comply with ANSI/BHMA A156.10-1984.
 5. UL10C certified
 6. Closer shall have extra-duty arms and knuckles
 7. Conform to ANSI 117.1
 8. Maximum 2 7/16 inch case projection with non-ferrous cover
 9. Separate adjusting valves for closing and latching speed, and backcheck
 10. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 11. Full rack and pinion type closer with 1½“ minimum bore
 12. Mount closers on non-public side of door, unless otherwise noted in specification
 13. Closers shall be non-handed, non-sized and multi-sized.
- G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be heavy-duty wrought brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered
- H. Kick-Down Door Stops: Provide a kick-down door stop for every opening as listed in the hardware sets.
1. Kick-down door stop shall be heavy duty wrought brass or stainless steel with ribbed rubber foot.
 2. Spring design to hold the stop in the up position.
 3. Provide fastener suitable for door construction.
- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
- K. Push Pull Bars: Provide ANSI J504, .1” Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
- L. Pulls: Solid Brass, Center to Center: 8”, Length: 8-1/2”, Projection: 2-1/2”.
- M. Power Supply: Provide power supply for (ELR) Electric Latch Retraction exit devices
1. Motherboard will accept up to four plug-in Control Modules. Provide the appropriate necessary control module to operate the number of ELR exit devices used at each opening. The Control Module shall include a Time delay Feature, variable (0-4 minutes) latch retraction period in response to a momentary input.



2. UL Listed for class II output
 3. Include circuit breakers for protection of motherboard
 4. 115 or 230 Volt user selectable switch, with AC input= 115 Volt at 1 Amp
 5. Control module shall include Fire alarm terminal and Auxiliary contacts for remote signaling.
 6. Precision ELR150 Series with the required modules.
- N. Power Supply: PS160 Use with a variety of applications including Electric Locking and Exit Alarm The power supply uses 120 VAC at 0.8 amp input. A 230 VAC at 0.3 ampere is available. The power shall be able to control up to (4) Delayed Egress Exit devices. The filtered and regulated output power is field selectable for 12 or 24 VDC at 2 amps.
1. Fire Alarm release that accepts normally closed contact
 2. AC input is protected via a manually reset circuit breaker
 3. DC output is protected via an auto-reset fuse (PTC)
 4. Box shall include a key lock.
- O. Electromagnetic Locks: BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door
1. Type: Full exterior or full interior, as required by application indicated.
 2. Strength Ranking: 1500 lbf.
- P. Power Supply: Field Selectable 12VDC or 24VDC output. The power supply will be specifically designed to support electric locks and access controls. The power supply uses 115 VAC at 800mA input. The power shall be able to be expanded to four station controls. The filtered and regulated output power is field selectable for 12 or 24 VDC.
1. Fire Alarm/Life Safety emergency release included in power supply.
- Q. Door Position Switch: Provide door position switch for door status monitoring as indicated in hardware sets.
1. At all fired rated doors the door and frame hardware preparation will be provided by the door and frame manufacturer or by an authorized label service agent.
- R. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- S. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- T. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.

- U. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½” for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
- V. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occurs.
- W. Kick Plates: Furnish .050” thick heavy duty kick plates at all interior doors for push and pull sides. Install with countersunk stainless steel screws.
- X. Key Control System: Provide heavy gauge steel wall-mount key cabinet large enough to accommodate all keys of all doors, mechanical equipment and furniture keys with 50% spare. Matte grey finish. Verify precise key capacity, locking mechanism (key or combination lock) and color with commissioner.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the City of New York's permanent keying system or furnished in the same keyway (or key section) as the City of New York's permanent keying system. Permanent cores and keys (prepared per the approved keying schedule, sequentially numbered and supplied with key tags) will be furnished directly to the City of New York.
- B. Cylinders, removable and interchangeable core system: Basis of Design Product: Subject to compliance with requirements, provide Best Cormax Patented 7-pin, or comparable product by one of the following:
 - 1. Schlage
 - 2. Yale
 - 3. Or approved equal
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit permanent keys and cores, Grand Masterkeys, Masterkeys and other Security keys to City of New York by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:



1. Grand Masterkey: 1 each
 2. Masterkeys: 4 each
 3. Change keys each keyed core: 5 each
 4. Construction masterkeys: 15 each
 5. Control keys: 1 each
- F. The City of New York will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying and programming meeting with Commissioner, Building personnel and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Commissioner.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.3 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.4 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.

- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

3.5 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
 - 1. Check and adjust closers to ensure proper operation.
 - 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 - 3. Report findings, in writing, to Commissioner indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.6 SCHEDULE OF FINISH HARDWARE:

- A. Basis of Design manufacturers are listed below. Refer to Article 2.1 for additional manufacturers and approved equal.

Manufacturer List

<u>Code</u>	<u>Name</u>
AR	Adams Rite
BE	Best Access Systems
BY	By Others
CR	Corbin Russwin
DM	Dorma Door Controls
EM	Emtek
KA	Kant-Slam
NA	National Guard
NO	Norton
PR	Precision
RO	Rockwood
RS	Reese Enterprises Inc.
RX	Rixon



SR	Sargent
ST	Stanley
TR	Trimco
IV	Ives
VD	Van Duprin

Finish List

<u>Code</u>	<u>Description</u>
AL	Aluminum
US28	Aluminum
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
US10	Dull Bronze
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull
OB	Oil Rubbed Bronze
DBAA	Dark Bronze Anodized Aluminum
PC	Powder Coated Finish

Option List

<u>Code</u>	<u>Description</u>
18	CONCEALED WIRES - 18 AWG (8)
AC	MOUNTING KIT - FOR ALUMINUM DOORS
BF	BARRIER FREE OPENING FORCE
CD	CYLINDER DOGGING
CE	CONC. WIRES-USE WITH 18,54,56,58 SUFFIX
FL	Fire Exit Hardware
ATR	ALUMINUM TOP RAIL ARMATURE BRACKET
B4E	BEVELED 4 EDGES
ELR	ELECTRIC LATCH RETRACTION
NRP	NON REMOVEABLE PIN HINGE
N-MD	"N" THRU BUTTON MTG - HM DRS
C-SUNK-KP	COUNTER SINKING OF KICK PLATES

Hardware Sets

HARDWARE SET A.1 (1Fl Exterior Doors):

2 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Hinge	CEFBB179 4 1/2 X 4 1/2 18 4" long wires	26D	ST
1 Lockset	ML20906xSEC (maglock/fail secure)	630	CR
1 Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1 Cylinder	6-Pin, interchangeable 8000 series core - keyed to match SET A.3	630	CR
1 Lever/Escutcheon Set	Lustra LWM	630	CR
1 Door Closer	PR8501M (parallel rigid arm) door stop point to be set at 100° - VIF	689	NO
1 Kick-Down Door Stop	461	626D	RO
1 Gasketing	5050 B @ Head and Jambs		NA
1 Finned Vinyl Door Shoe	312V (7/16" high – provide door undercut)	US28	NA
2 Kick Plates	custom 1/16" thick SS w/ rounded corners, 12" high		
1 Threshold	277A Corrugated Flat Plate	US28	RS
2 Threshold Cap	S247A Assembly Component	US28	RS
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

HARDWARE SET A.2 (2Fl Exterior Door at Stair 2):

2 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Hinge	CEFBB179 4 1/2 X 4 1/2 18 4" long wires	26D	ST
1 Lockset	ML20906xSEC (maglock/fail secure)	630	CR
1 Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1 Cylinder	6-Pin, interchangeable 8000 series core - keyed to match SET A.3	630	CR
1 Lever/Escutcheon Set	Lustra LWM	630	CR
1 Door Closer	PR8501M (parallel rigid arm) door stop point to be set at 95° - VIF	689	NO
1 Floor Door Stop w/Keeper	472	626	RO
1 Gasketing	5050 B @ Head and Jambs		NA
1 Finned Vinyl Door Shoe	312V (7/16" high – provide door undercut)	US28	NA
2 Kick Plates	K0050, 10" high	630	TR
1 Threshold	280A Corrugated Flat Plate	US28	RS
2 Threshold Cap	S247A Assembly Component	US28	RS
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

HARDWARE SET A.3 (Stair 1):

3 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Lockset	ML2067, Apartment or Dormitory (ANSI F20)	630	CR
1 Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1 Cylinder	6-Pin, interchangeable 8000 series core - keyed to match SET A.1	630	CR
1 Lever/Rose Set	Lustra LWA	630	CR
1 Door Closer	PR8501M (parallel rigid arm) door stop point to be set at 90° - VIF	689	NO
1 Floor Door Stop w/Keeper	472	626	RO
1 Power Supply	PS160		PR

1	Gasketing	5050 B @ Head and Jambs		NA
1	Finned Vinyl Door Shoe	312V (7/16" high – provide door undercut)	US28	NA
2	Kick Plates	K0050, 10" high	630	TR
1	Threshold	235A Corrugated Flat Plate	US28	RS
2	Threshold Cap	S247A Assembly Component	US28	RS
1	Wiring Diagram	ALL ELECTRIFIED ITEMS		

HARDWARE SET B.1 (Crawl Space & Utility Sink):

3	Hinges	FBB179 4 1/2 X 4 ½	26D	ST
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Lockset	ML2048, Entrance or Apartment (ANSI F8/F10)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Floor Dome Stop	443	626	RO
3	Door Silencers	608	GRY	RO
2	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET B.2 (MEP Rooms – out swinging):

3	Hinges	FBB179 4 1/2 X 4 ½	26D	ST
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Lockset	ML2048, Entrance or Apartment (ANSI F8/F10)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Door Closer	PR8501M (parallel rigid arm)	689	NO
		door stop point to be set at 110° (100° at ELEC 214) – VIF		
1	Fire and Smoke Seal	5050C Silicon Bulb Fire & Smoke Seal, charcoal	C	NA
1	Finned Vinyl Door Shoe	312V (7/16" high – provide door undercut)	US28	NA
3	Door Silencers	608	GRY	RO
2	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET B.3 (MEP Rooms – in swinging):

3	Hinges	FBB179 4 1/2 X 4 ½	26D	ST
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Lockset	ML2048, Entrance or Apartment (ANSI F8/F10)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Door Closer	8501M (regular arm)	689	NO
		door stop point to be set at 90° - VIF		
1	Fire and Smoke Seal	5050C Silicon Bulb Fire & Smoke Seal, charcoal	C	NA
1	Finned Vinyl Door Shoe	312V (7/16" high – provide door undercut)	US28	NA
3	Door Silencers	608	GRY	RO
2	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET B.4 (Training Room – not lockable for egress):

3	Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
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1	Lockset	ML2010, Passage or Closet (ANSI F01)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Floor Dome Stop	443	626	RO
3	Door Silencers	608	GRY	RO
2	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET B.5 (Supervisor Office):

3	Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Lockset	ML2067, Apartment or Dormitory (ANSI F20)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Floor Dome Stop	443	626	RO
3	Door Silencers	608	GRY	RO
2	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET C.1 (Garage Doors):

1	Key Switch	To control door.		
1	Cylinder	6-Pin, interchangeable 8000 series core - keyed to match SET A.1	630	CR

(See Section 083324 High-Speed Roll Up Doors)

HARDWARE SET D.1 (Janitor / Laundry two leaf doors)

6	Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Lockset	ML2048, Entrance or Apartment (ANSI F8/F10)	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
2	Lever/Rose Set	Lustra LWA	630	CR
2	Floor Dome Stop	443	626	RO
6	Door Silencers	608	GRY	RO
4	Kick Plates	K0050, 10" high	630	TR

HARDWARE SET E.1 (Men)

3	Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1	Lockset	Sargent KP8200, Key Pad Mortise Lock	630	CR
1	Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1	Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1	Lever/Rose Set	Lustra LWA	630	CR
1	Door Closer	PR8501M (parallel rigid arm) door stop points to be set at 90° (Men), 110° (Women) - VIF	689	NO
1	Floor Dome Stop	443	626	RO
1	Kick-Down Door Stop	461	626D	RO
3	Door Silencers	608	GRY	RO

2 Kick Plates	K0050, 10" high	630	TR
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HARDWARE SET E.2 (Women)

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	Sargent KP8200, Key Pad Mortise Lock	630	CR
1 Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1 Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1 Lever/Rose Set	Lustra LWA	630	CR
1 Door Closer	PR8501M (parallel rigid arm)	689	NO
	door stop points to be set at 90° (Men), 110 ° (Women) -		VIF
1 Kick-Down Door Stop	461	626D	RO
3 Door Silencers	608	GRY	RO
2 Kick Plates	K0050, 10" high	630	TR

HARDWARE SET F.1 (Robot Shop):

1 Pivot Set	1-1/2" Offset Top & Bottom Pivot 117-1/2	26D	RX
1 Pivot Set	3/4" Offset Top & Bottom Pivot 117-1/2	26D	RX
1 Cylinder	6-Pin, interchangeable 8000 series core	630	CR
1 Lockset	ML2067, Apartment or Dormitory (ANSI F20)	630	CR
1 Strike (for Lockset above)	Strike Box & Straight Lip Strike Plate	630	CR
1 Lever/Rose Set	Lustra LWA	630	CR
1 Floor Door Stop w/Keeper	472	626	RO
4 Kick Plates	K0050, 10" high	630	TR
1 Flush Bolt (inactive leaf)	550, rod size 12"	26D	RO
1 Flush Bolt (inactive leaf)	550, rod size 36"	26D	RO
2 Dust Proof Strike (inactive leaf)	570 (for open and for closed position)	26D	RO
2 Pile Door Shoes (bottom)	254P, 1-7/16" wide, for 3/8" door clearance	630	NA
1 Astragal (active leaf)	550, powder coated to match door	PC	NA
1 Neoprene Side Gasket	approx. 1-1/2" x 3/16" -V.I.F (see detail)	N.A.	N.A.
1 Neoprene Gasket	approx. 1-1/2" x 1/2" -V.I.F (see detail)	N.A.	N.A.

END OF SECTION 08 71 00



SECTION 08 81 00

GLASS GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:

1. Windows.
2. Doors.
3. Entrances.
4. Storefront framing.
5. Interior borrowed lites.
6. Interior mirrors, frameless.

- B. Related Sections

1. Section 08 11 13 "Hollow Metal Doors and Frames"
2. Section 08 51 13 "Aluminum Windows"
3. Section 10 28 00 "Toilet, Bath and Laundry Accessories" for framed mirrors.

1.3 REFERENCES

- A. Comply with the recommendations of the following references unless more stringent requirements are indicated herein.
1. FGMA Publications: FGMA Glazing Manual.
 2. AAMA Publications: AAMA TIR-A7 Sloped Glazing Guidelines and Glass Design for Sloped Glazing.
 3. LSGA Publications: LSGA Design Guide.



4. SIGMA Publications: TM-3000 Vertical Glazing Guidelines and TB-3001 Sloped Glazing Guidelines.
5. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201.
6. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E152, labeled and listed by UL or another testing and inspecting agency acceptable to the Commissioner.
7. Fire-Resistive Glazing Products for Window Assemblies: Products identical to those tested per ASTM E163, labeled and listed by UL or another testing and inspecting agency acceptable to the Commissioner.
8. 16 CFR 1201, Safety Standards for Architectural Glazing, Sealed Insulating Glass Manufacturing Association.
9. ASTM C 920, Elastomeric Joint Sealant.
10. Insulating Glass Criteria - IGCC International Glass Cert. Council.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: 30 psf or greater if required by 2008 New York City Building Code.
 2. Probability of Breakage for Vertical Glazing:
 - a. 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - b. 1 lite per 1000 for lites installed 15 degrees from the vertical and under wind action.
 - c. Load Duration: 60 seconds or less.



3. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 0.5", whichever is less.
 4. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.
 5. Thermal Solar Performance: See Article 2.2 herein.
- C. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind and/or snow loads and safety glazing requirements, as shown, specified or recommended by the glass fabricator and as required by 2008 New York City Building Code.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's printed product data, specifications, standard details, glazing instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements, including performance requirements.
- C. Submit compatibility and adhesion test reports from sealant manufacturer indicating materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.
- D. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.
 1. Submit complete range of samples of standard colors and patterns for ceramic frits at insulating glass.
 2. Submit complete range of samples of sandblasted glass showing variations of grits and opacity achieved.
- E. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.



- F. Calculations: Provide wind load charts, calculations, thermal stress analysis, and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied. Document shall be signed and sealed by a Professional Engineer licensed in the State of New York.
- G. Test Reports: Provide certified reports for specified tests.
- H. Warranties: Provide written warranties as specified herein.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."
 - 2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units."
- E. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to the Commissioner, for fire-protection ratings indicated, based on testing according to NFPA 252.
- F. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to the Commissioner, for fire ratings indicated, based on testing according to NFPA 257.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council.



2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 Articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of 2008 New York City Building Code.
- H. Insulating Glass Certification Program: Permanently marked on spacers with appropriate certification label of the following testing and inspecting agency:
 1. Insulating Glass Certification Council.
 2. Associated Laboratories, Inc.
 3. Insulating Glass Manufacturers Alliance.
- I. Manufacturer shall be ISO 9001-2000 Certified.

1.7 TESTS

- A. Preconstruction Sealant Test: Submit samples of materials to be used to glazing sealant manufacturer to determine sealant compatibility. Include samples of glass, gaskets, glazing materials, framing members, and other components and accessories of glazing work. Test in accordance with ASTM C 794 to verify what type of primers (if any) are required to ensure sealant adhesion to substrates.
 1. Submit minimum of nine pieces of each type and finish of framing member, and nine pieces of each type, class, kind, condition, and form of glass, including monolithic, laminated, and insulating glass for adhesion tests.
 2. Provide manufacturer's written report and recommendations regarding proper installation.

1.8 PROJECT CONDITIONS

- A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.
- B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.



1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
2. Sequence deliveries to avoid delays, but minimize on-site storage.

1.10 WARRANTIES

- A. **Manufacturer's Warranty on Coated Glass Products:** Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.
1. **Warranty Period:** Manufacturer's standard but not less than five (5) years after date of substantial completion.
- B. **Manufacturer's Warranty on Insulating Glass:** Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure of the hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period.
1. **Warranty Period:** Manufacturer's standard but not less than ten (10) years after date of substantial completion.
- C. **Manufacturer's Warranty on Laminated Glass:** Manufacturer's standard form, made out to the City of New York and signed by laminated glass manufacturer agreeing to replace laminated glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. **Warranty period** five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS/FABRICATORS

- A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project. Subject to compliance with requirements, provide products by one of the following:



1. PPG Industries.
2. Guardian Industries.
3. Pilkington.
4. AFG.
5. JE Berkowitz, LP.
6. Viracon.
7. Or approved equal.

2.2 GLASS MATERIALS AND PRODUCTS

- A. Clear Float Glass: ASTM C 1036, Type I (Transparent, Flat), Class 1 (Clear), Quality q3, minimum 1/4" thick.
- B. Clear Tempered Glass: ASTM C 1048, Condition A (Uncoated), Type I (Transparent, Flat), Class 1 (Clear), Quality q3, Kind FT, minimum 1/4" thick. Tempered glass must be certified by SGCC to meet applicable standards. Tempered glass shall also conform to the following:
 1. Length and Width: For 2.9 mm to 6.0 mm; +/-1.6 mm.
 2. Diagonal: +/- 3.0 mm.
 3. Edgework: Belt seaming or diamond wheels. 1.5 mm seam of upper and lower glass edges. No sharp edges.
 4. Corners: No more than 3.0 mm from square.
 5. Float Glass Defects: Must meet the requirements of ASTM C 1036. The most common defects are scratches, stones gaseous bubbles and edge chips. Tables in the glass standards have limits for size/quantity of defects.
 6. Tempered glass shall have a minimum surface compression of 10,000 psi.
 7. Tempered glass to be heat-treated by horizontal (roller hearth) process with inherent roller-wave distortion parallel to the bottom edge of the glass when installed.
 8. Flatness Tolerances
 - a. Roller-Wave or Ripple: The deviation from flatness at any peak shall be targeted not exceed 0.003" as measured per peak to valley for 1/4" (6mm) thick glass.
 - b. Bow and Warp: The bow and warp tolerances shall not exceed 1/32" per linear foot.



- c. Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.

C. Low 'E' Coated Glass: Provide high-performance, clear, metallic coating, equal to Solarban 60, as manufactured by Vitro Architectural Glass (basis of design), Viracon, Guardian or equal. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1" insulating units, both lites 1/4" clear, or when applied to the No. 2 and No. 4 surfaces of 1-3/4" insulating units, all lites 1/4" clear:

	1" IGU	1-3/4" IGU
1. Visible Transmittance:	0.46%	0.37%
2. Winter U-value	0.32	0.20
3. Solar Heat Gain Coefficient (SHGC)	0.26	0.21

D. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C 1172, and as follows:

- 1. Interlayer Color: Clear.
- 2. Interlayer Material: Provide Monsanto "Saflex" or DuPont "Butacite," 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.
- 3. Minimum thickness of 1/4".

E. Insulating Glass

- 1. Provide factory assembled units of originally sealed panes of glass enclosing a hermetically sealed dehydrated air space comply with ASTM E2190.
- 2. Double Pane IGU's at Light Court:
 - a. Glazing Description: 6mm SB60 ARG 6mm CL. All glass to be tempered for internal stresses due to coatings. Glass thicknesses to be 1/4", tint to be clear. Gap widths to be 1/2", gap fill to be Argon 90 and spacer to be TS-D. No divider.
- 3. Triple Pane at IGU's at 1st Floor Clerestory:
 - a. Glazing Description: 6mm SB60 ARG 6mm CL. All panes to be Low Iron Glass. All glass to be tempered for internal stresses due to coatings. Glass thicknesses to be 1/4", tint to be clear. Gap widths to be 1/2", gap fill to be Argon 90 and spacer to be TS-D. No divider.
- 4. Triple Pane at IGU's at 2nd floor Casements:



- a. Glazing Description: 6mm, SB60 ARG 6mm CL. All glass to be tempered for internal stresses due to coatings. Glass thicknesses to be 1/4", tint to be clear. Gap widths to be 1/2", gap fill to be Argon 90 and spacer to be TS-D. No divider.
5. Sealing System: Dual Seal.
6. Primary Sealant: Polyisobutylene.
7. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, or Dow Corning 982, Dymax Corp. or approved equal.
 - a. For structurally glazed IG units, secondary seal shall conform to ASTM C 1249.
8. Primary and secondary seals shall not contain voids and must be continuously bonded to the glass structure.
9. Warm Edge Spacer: Grey color at Light Well and 2nd Floor. Black at 1st Floor Clerestory.
10. Desiccant: Molecular sieve, silica gel, or blend of both.
11. Air Space Thickness: 1/2". (2 x 1/4")
12. Glass Thickness: 1/4" minimum.
13. Units shall be certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGCC) or by IGMA, and tested in accordance with the above ASTM Test Methods.
14. Insulating glass shall conform to the following tolerances:
 - a. Length and Width: + 3.0 mm/ -2.0 mm.
 - b. Diagonal: +/- 3.0 mm.
 - c. Thickness: As agreed +/- 1.0 mm.
 - d. Edge-Deletion of Coating: Minimum 8 mm wide. Width of deletion must be more than the width of the secondary seal. Silver layer(s) must be completely removed. Appearance must be uniform.
 - e. Primary PIB Seal: Must be complete with no breaks. Appearance must be uniform. PIB bead must overlap coating. No visible bright line when glass is viewed in transmission. The width of the PIB bead shall be 4.0 mm + 3.0/ - 1.5 mm.
 - f. Secondary Seal: Nominal 6 mm + 3.0/ - 1.5 mm. The minimum width of the secondary silicone seal for IG units that are glazed structurally must be determined according to ASTM C 1249. The secondary seal must be uniformly applied without bubbles, cavities or gaps. Avoid excess sealant that will need to be trimmed off later.



15. Additional requirements and properties for primary and secondary insulating glass seals and spacers:
 - a. All glass units shall comply with IGMA Guidelines which limits the dimension of the visible edge seal encroachment into the vision area to be no greater than the “sightline infringement of 3mm(0.12”).
 - b. Insulating glass unit hermetic seal to consist of butyl primary and silicone secondary seals with bent, welded, or soldered interpane spacer corners; keyed corners are not acceptable unless also soldered or welded. Spacers shall be aluminum or stainless steel. Locate spacer joint at the top or sides of the units, but in no instances at the sill. Design units to minimize the number of spacer joints. Provide solid keys, embedded in butyl sealant on all four sides, at spacer joints.
 - c. Hermetic seals must be continuous and intimately bonded to both lites of glass. Provide primary seal of uniform depth with a nominal width of 1/8 to 3/16 in. Hermetic seals shall not be contaminated with debris, fingerprints, or other foreign matter and shall not contain voids or air pockets that decrease the width of the seal below the minimum widths listed in these Specifications, or that breach the seal. The width of the primary seal shall not be less than 1/16 in., and the total cumulative length of the primary seal between 1/16 in. and 1/8 in. shall be less than 12 in. in any one insulating glass unit. The primary seal shall not have a reduced thickness at the corners. An increased thickness of the primary seal at the corners is acceptable.
 - d. Provide secondary seal of uniform depth with a nominal width of 1/4 in. Provide a total width of the primary and secondary seal of 1/2 in. Units shall carry CBA rating as established by ASTM E774 and shall meet SIGMA 65-7-2, latest edition. Units shall not contain breather or capillary tubes or similar penetrations.

2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:
 1. Dow Corning 795.
 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
 3. Tremco Spectrem 2.
 4. Or approved equal.
- C. Weather Seal Sealant: Provide non-acid curing sealant with movement range $\pm 50\%$, ASTM C 719. Provide one of the following:
 1. Dow Corning 795.



2. General Electric Silpruf.
 3. Tremco Spectrem 2.
 4. Or approved equal.
- D. Backer Rod: Closed cell non-gassing polyethylene rod with rod diameter 25% wider than joint width.
- E. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75 ± 5 for hollow profile, and 60 ± 5 for solid profiles, ASTM C 864.
- F. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40 ± 5 , and 20% to 35% compression, ASTM C 509; Type II.
- G. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form.
- H. Setting Blocks: Provide 100% silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.
1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
 2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulating units with silicone edge seals.
- I. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55 ± 5 .
- J. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- K. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.
- L. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C. R. Laurence Co., Inc.
 - b. Palmer Products Corporation
 - c. Pecora Corporation
 - d. Or approved equal.



- M. Clips: No. 4 finish Type 304 stainless steel.

2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.
- C. Grind smooth and polish exposed glass edges.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.4 GENERAL GLAZING STANDARDS

- A. Install products using the recommendations from the manufacturer of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".
- B. Verify that Insulating Glass (IG) Unit secondary seal is compatible with glazing sealants.
- C. Install glass in prepared glazing channels and other framing members.
- D. Install setting blocks in rabbets as recommended by referenced glazing standards in "GANA Glazing Manual" and "IGMA Glazing Guidelines".



- E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by “GANA Glazing Manual”.
- F. Provide weep system as recommended by “GANA Glazing Manual”.
- G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.
- H. Distribute the weight of glass unit along the edge rather than the corner.
- I. Comply with manufacturers and referenced industry standards on expansion joint and anchors; accommodating thermal movement; glass openings; use of setting blocks, edge, face, and bite clearances; use of glass spacers; edge blocks and installation of weep systems.
- J. Protect glass edge damage during handling and installation.
- K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.
- L. Remove and replace glass that is broken, chipped cracked or damaged in any way.

3.5 GLAZING

- A. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead. Install setting blocks at the one greater points of each lite along the horizontal mullion.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.



- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- K. Flush Glazing
 - 1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.
 - 2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.
 - 3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.
- L. Off-Set Glazing
 - 1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape shall be cut to the exact length of the dimension between the applied tapes, and installed on the outermost glazing leg.
 - 2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.
 - 3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.
 - 4. Set edge block according to glass manufacturer's recommendations.
 - 5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.
 - 6. In a vented system, apply a heel bead (air seal) of sealant around the perimeter of glass, between the sole of the I.G. unit and the base of the rabbet of the metal framing developing a positive bond to the unit and to the metal framing. The bead of the sealant shall be deep enough so that it will partially fill the channel to a depth of 1/4" between the glass edge and the base of the metal framing rabbet.



7. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

3.6 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

3.7 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

3.8 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure



spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Exterior glazing gasket shall be set a minimum of 1/8" below exterior glazing stop to create a channel for sealant installation.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.9 FRAMELESS MIRRORS

- A. Apply mastic to back of mirror "pats" spaced 4 pats/sq. ft.; adjust mirror so that it is plumb and in place to avoid distortion of reflecting images. Allow 1/8" space between back of mirror and wall surface.
- B. Apply stainless steel clips at mirror top and bottom; securely clip to substrate using non-corrosive anchors. At drywall back-up anchors must be secured to studs or steel wallplate spanning from stud to stud.

3.10 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.
- F. Glass to be cleaned according to:
 1. GANA Glass Informational Bulletin GANA 01-0300 – "Proper Procedure for Cleaning Architectural Glass Products".
 2. GANA Glass Informational Bulletin GANA TD-02-0402 – "Heat Treated Glass Surfaces are Different".



G. Do not use razor blades, scrapers or metal tools to clean glass.

END OF SECTION 08 81 00



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SECTION 08 95 43

FLOOD VENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes flood vents.
- B. Related Sections
 - 1. Section 03 30 00 "Cast-in-Place Concrete"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: A complete and detailed description of all foundation flood vents shall be submitted with all pertinent data from the NES Testing Service showing the vents are Certified. Catalog cuts and drawings shall be submitted as well as installation instructions.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Use adequate numbers of skilled workmen who are thoroughly instructed and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide flood vents by Smart Vent (models described in Article 2.2), or a comparable product by one of the following:
 - 1. Flood Flaps



2. Flood Barrier America
3. Or approved equal.

2.2 MATERIALS

- A. General: Vents shall be constructed of stainless steel formed and smooth-welded construction. The frame shall be rigid and designed to be installed in stud walls. It shall have a pivoting door assembly that is fitted with two patented sealed floats that immediately and automatically release the door upon contact with rising water to relieve unbalanced lateral forces on foundation walls. The door shall swing open to provide two horizontal slot openings with a total combined unobstructed area of 76 square inches. The lower slot provides a 3" clear opening. One Single unit shall be used to relieve 200 square feet of enclosed area.
- B. Flood Vent Type (as listed by Samrt Vent or one of the manufacturers above)
 1. Type A: Multi-frame model ss insulated vent, 4Wx2H (8 door/unit). Model #1540-150402 or comparable product by a manufacturer in 2.1.A or approved equal.
 - a. Provide sleeve and trim. Model #1540-531-15.
 2. Type B: Smart vent model ss insulated vent (single door). Model #1540-520 or comparable product by a manufacturer in 2.1.A or approved equal.
 - a. Provide sleeve and trim. Model #1540-531-12.
 3. Type C: Smart vent model ss insulated vent (single door). Model #1540-520 or comparable product by a manufacturer in 2.1.A or approved equal.
 - a. Provide sleeve and trim. Model #1540-531-12
 - b. Provide fire damper #1540-530
- C. Installation
 1. Stainless Steel straps, four for each vent, and masonry or concrete urethane base adhesive.
 2. Adjustable wrench for through-bolted models and screwdriver for stud wall models.
 3. NOTE: Caulk may be used to seal certain areas that require extra attention; only fire-rated caulk shall be used in fire-rated walls or openings.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSTALLATION

- A. Install each vent in accordance with manufacturer's instructions and recommendations spaced evenly around foundation perimeter, maximum 12 inches above grade to bottom of vent.
- B. Install one quad flood vent for every 800 square feet of enclosed space below flood plain.
- C. Adjust flood vents for proper operation.

END OF SECTION 08 95 43



**Department of
Design and
Construction**

FMS No. - SANDBOMB

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SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
2. Metal supports for gypsum drywall construction.
3. Acoustical insulation for gypsum drywall work.
4. Sealant for gypsum drywall work.
5. Concealed metal reinforcing for attachment of railings, toilet partitions and other items supported on drywall partitions and walls.
6. Taping and finishing of drywall joints.
7. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
8. Bracing and connections.

B. Related Sections

1. Section 07 21 00 "Thermal Insulation"
2. Section 08 11 13 "Hollow Metal Doors and Frames"
3. Section 08 31 13 "Access Doors and Frames"
4. Section 09 90 00 "Painting and Coating"
5. Section 23 37 13 "Diffusers, Registers and Grilles"



1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- C. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- D. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.
- E. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:
 - 1. The Gypsum Construction Handbook, latest edition, USG.
 - 2. Construction Guide, latest edition, National Gypsum.
 - 3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For"
 - 4. ASTM C 475 "Standard Specification for Joint Treatment Materials For Gypsum Wallboard Construction"
 - 5. ASTM C 645 "Standard Specification for Non-Structural Steel Framing Members"
 - 6. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products"
 - 7. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board"
 - 8. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications"



9. ASTM C 954 "Standard Specification for Steel Drill Screws For the Application of Gypsum Board or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness"
 10. ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws For the Application of Gypsum Board"
 11. ASTM C 1177 "Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing"
 12. ASTM C 1178 "Standard Specification for Glass Mat Water Resistant Gypsum Backing Board"
 13. ASTM C 1278 "Standard Specification for Fiber-Reinforced Gypsum Panel"
 14. ASTM C 1396 "Standard Specification for Gypsum Board"
 15. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"
- C. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.
- D. System Design Load
1. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
 - a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
 2. Provide drywall ceiling assemblies designed, fabricated and installed to have a deflection not to exceed L/360.
- E. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to the Commissioner, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.
- F. Comply with New York City Official Compilation of the Rules of the City of New York regarding "Impact Resistant Stair and Elevator Enclosures" when such enclosures are of gypsum drywall construction.



1.5 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.
- B. Protect wallboard from becoming wet.

1.6 ENVIRONMENTAL CONDITIONS

- A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

1.7 JOB MOCK-UP

- A. At a suitable location, where directed by the Commissioner, lay up a portion of a finished wall and ceiling demonstrating the quality of work, including finishing, to be obtained under this Section. Omit drywall boards in locations as directed by the Commissioner to show stud spacing and attachments; after acceptance, complete assembly.
- B. Adjust the finishing techniques as required to achieve the finish required by the Commissioner as described in this Section of these specifications.
- C. Upon approval of the mock-up, the mock-up may be left in place as a portion of the finished work of this Section.
- D. All drywall work shall be equal in quality to approved mock-up.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers for Gypsum Drywall Panels and Accessories: Subject to compliance with requirements, provide products by one of the following:
 - 1. U.S. Gypsum Co.
 - 2. Georgia Pacific
 - 3. CertainTeed Corporation
 - 4. Continental
 - 5. National Gypsum Co.



6. Or approved equal.
- B. Manufacturers for Metal Supports of Drywall Assemblies: Subject to compliance with requirements, provide products by one of the following unless otherwise noted:
 1. ClarkDietrich Building Systems
 2. Super Stud Building Products
 3. Marino/Ware
 4. Or approved equal.

2.2 METAL SUPPORTS

- A. Metal Floor and Ceiling Runners
 1. Channel Type: Formed from 20 U.S. Std. gauge (unless otherwise noted) galvanized steel, width to suit channel type metal studs. Use 20 ga. top runners with 1-1/4" minimum flanges.
 2. Ceiling runners and head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 20 ga. galvanized steel for clips, 25 ga. galvanized steel for ceiling runners. Providing a friction free – anti-seizure movement capacity.
 - a. Basis of Design Product: Subject to compliance with requirements, provide Steel Network; VertiClip or VertiTrack or comparable product by one of the following:
 - 1). Metal-Lite Inc.
 - 2). Fire Trak Corporation
 - 3). Or approved equal.
 - b. Basis of Design Product: Subject to compliance with requirements, provide Fire Trak Corporation; FireTrak (including stud clips) or comparable product by one of the following:
 - 1). Metal-Lite Inc.
 - 2). ClarkDietrich Building Systems
 - 3). Or approved equal.
- B. Metal Studs, Framing and Furring
 1. Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 U.S. Std. gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.
 2. Furring Channels: Hat shaped, formed from galvanized steel, 25 U.S. Std. gauge.



3. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions and other items supported on drywall partitions and walls.

C. Suspended Ceiling and Fascia Supports

1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rust-inhibitive paint finish.
2. Furring Members: Screw-type hat-shaped furring channels of 25 ga. zinc-coated steel; comply with ASTM C 645.
3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.
4. Hanger Anchorages: Provide inserts, clips, bolts, screws and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.
5. Furring Anchorages: 16 ga. galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.

D. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

2.3 GYPSUM WALLBOARD TYPES

A. Gypsum Wallboard: 5/8" thick unless otherwise noted, 48" wide, in maximum lengths available to minimize end-to-end butt joints.

1. Product: Subject to compliance with requirements, provide one of the following:
 - a. USG; Sheetrock
 - b. National Gypsum; Gold Bond
 - c. CertainTeed Corp.; Regular Gypsum
 - d. Or approved equal.

B. Fire-Rated Gypsum Wallboard: 5/8" thick unless otherwise noted, 48" wide, in maximum lengths available to minimize end-to-end butt joints.

1. Product: Subject to compliance with requirements, provide one of the following:
 - a. USG; Sheetrock Firecode C
 - b. Lafarge/Continental; Firecheck Type C
 - c. National Gypsum; Gold Bond Fireshield
 - d. Or approved equal.

C. Moisture/Mold-Resistant Gypsum Wallboard (at locations indicated on the drawings): 5/8" thick unless otherwise noted, 48" wide, in maximum lengths available to minimize



end-to-end butt joints. Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6 or ASTM C 1658.

1. Product: Subject to compliance with requirements, provide one of the following:
 - a. USG; Mold Tough or Mold Tough FR
 - b. Georgia Pacific; DensArmor Plus
 - c. Lafarge/Continental; Mold Defense and/or Mold Defense Type X
 - d. National Gypsum; Gold Bond EXP Interior Extreme Gypsum Board
 - e. Or approved equal.

D. Abuse Resistant Wallboard: 5/8" thick unless otherwise noted, 48" wide, in maximum lengths available to minimize end-to-end butt joints.

1. Board must achieve a Level 1 rating per ASTM C 1629.
2. Provide two layers of very high impact/abuse resistant wallboard in all occupied spaces.
3. Product: Subject to compliance with requirements, provide one of the following:
 - a. USG; Fiberock Brand Panel VHI Abuse Resistant
 - b. Georgia Pacific; Dens Armor Plus Abuse Resistant Panels
 - c. Lafarge/Continental; Protecta AR100 or Protecta HIR 300
 - d. National Gypsum; EXP Interior Extreme AR or Gold Bond Brand Hi-Abuse XP
 - e. Or approved equal.

2.4 ACCESSORIES

A. Acoustical Insulation: Paper-less, non-combustible, semi-rigid mineral fiber, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density

1. Product: Subject to compliance with requirements, provide one of the following:
 - a. Thermafiber LLC; Thermafiber
 - b. Roxul; Comfortbatt
 - c. Owens Corning; Sound Attenuation Fire Batt Insulation/MW
 - d. Or approved equal.

B. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.

C. Laminating Adhesive: As recommended by gypsum board manufacturer.



- D. Metal Trim - Corner Beads: For 90 degree External Corners - 27 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners; ASTM C 1047.
- E. Metal Trim - Edge Beads: Paper-faced galvanized-steel sheet; ASTM C 1047.
- F. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; setting type or lightweight setting type joint compound for taping and topping; and ready-mix compound for finishing.
 - 1. For mold-resistant drywall, water resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274.
 - 2. Joint Compound
 - a. Product: Subject to compliance with requirements, provide one of the following:
 - 1). CTS Cement Manufacturing Corp.; Rapid Set One Pass
 - 2). Lafarge North America; Rapid Joint
 - 3). CertainTeed; M2Tech 90
 - 4). Or approved equal.
- G. Control Joints
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide USG; No. 0.093 or comparable product by one of the following:
 - a. Lafarge
 - b. National Gypsum
 - c. Or approved equal.
- H. Acoustical Sealant
 - 1. Product: Subject to compliance with requirements, provide one of the following:
 - a. USG; Sheetrock Brand Acoustical Sealant
 - b. Tremco Mfg. Co.; Tremco Acoustical Caulking
 - c. Pecora; AIS-919
 - d. Or approved equal.
- I. Neoprene Gaskets: Conform to ASTM D 1056.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 GENERAL INSTALLATION REQUIREMENTS

A. General

1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
3. Provide concealed reinforcement, 16 ga. thick by eight (8) inches wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using two (2) self-tapping pan head screws at each stud.
 - a. Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.

B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of the 2008 New York City Building Code, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.

C. Acoustical Assemblies: Install acoustically-rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.

D. Sealant

1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.
3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.

E. Wall Board Application



1. Do not install wallboard panels until steel door frames are in place; coordinate work with Section 08 11 13, "Hollow Metal Doors and Frames."
 2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
 3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
 4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
 5. Provide fire safing insulation meeting standards of Section 07 84 13 "Penetration Firestopping " at flutes of metal deck where partitions carry up to bottom of metal deck.
 6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.
 7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
 8. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
 9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.
- F. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.
1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
 2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
 3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.



- G. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:
1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
 2. Construction changes within the plane of the partition or ceiling.
 3. Shown on approved shop drawings.
 4. Ceiling dimensions exceed thirty (30) feet in either direction.
 5. Wings of "L," "U," and "T" shaped ceiling areas are joined.
 6. Expansion or control joints occur in the structural elements of the building.
 7. Shaftwall runs exceed 30' without interruption.
 8. Partition or furring abuts a structural element or dissimilar wall or ceiling.
 9. Partition or furring runs exceed 30' without interruption.
 10. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.
- H. Joint Treatment and Spackling
1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
 2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.3 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space sixteen (16) inches o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced sixteen (16) inches o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least eight (8) inches and securely anchoring to concrete or masonry with two (2) fasteners in each wing.



- B. Wallboard Installation: Same as specified under Article 3.4 - "Metal Stud Partitions."

3.4 METAL STUD PARTITIONS

- A. Unless otherwise noted, steel framing members shall be installed in accordance with ASTM C754.
- B. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely sixteen (16) inches o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal door frames. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.
- C. Stud Installation
1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than sixteen (16) inches o.c.
 2. Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement. Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.
 3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.
 4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.
 5. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.
 6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.
 7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner sixteen (16) inches maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.



8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with eight (8) inches minimum nested laps and attach flanges together with two (2) sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.
- D. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs sixteen (16) inches o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.5, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over thirty-six (36) inches o.c. vertically.
- E. Wallboard Installation - Single Layer Application (Screw Attached)
1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.
 2. Boards shall be fastened securely to metal studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.
 3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
 4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
 5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.
- F. Wallboard Installation - Double-Layer Application
1. General: See drawings for wallboard partition types required.
 2. First Layer (Screw Attached): Install as described above for single layer application.



3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset thirty-two (32) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into metal framing members.
 4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.
- G. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.
- H. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.
- I. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by Commissioner.
- J. Control Joints
1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
 2. Back by double framing members.
 3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
 4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.
- 3.5 DRYWALL FASCIAS AND CEILINGS
- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
 - B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.



- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space sixteen (16) inches o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than eight (8) inches and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
 - 1. Provide special furring where ducts are over two (2) feet wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

3.6 ERECTION AT COLUMN ENCLOSURES

- A. Metal furring supports shall be provided under work of this Section, and shall be cut to lengths as necessary for tight fit such that spacing is not more than sixteen (16) inches o.c.
- B. Board shall be fastened securely to supports with screws as specified. Place boards in position with minimum amount of joints. Where free ends occur between supports, back-blocking or furring shall be required. Center abutting ends over supports. Correct work as necessary so that faces of boards are flush, smooth and true. Provide clips or cross furring for attachment as required.
- C. All layers shall be screw attached to furring.
- D. When column finish called for on drawings to be in the same plane as drywall finish layer, maintain even, level plane.

3.7 FINISHING

- A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.



- B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.
- C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.
- F. Except as otherwise noted, level of finish for surface exposed to view shall conform to Level 4 of ASTM C 840 and GA-214 of the Gypsum Association.
 - 1. For drywall boards with fiberglass facing, provide Level 5 finish of ASTM C840 and GA-214.
- G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the City of New York.

END OF SECTION 09 29 00



SECTION 09 30 13

CERAMIC TILING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Ceramic wall tile and base.
 - 2. Setting beds, grout, sealant and waterproofing membrane.
- B. Related Sections
 - 1. Section 09 29 00 "Gypsum Board"

1.3 REFERENCES

- A. ANSI A108 Series/A118 Series - American National Standards for Installation of Ceramic Tile.
- B. ANSI A136.1 - American National Standards for Organic Adhesives for Installation of Ceramic Tile.
- C. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
- D. ASTM C 150 - Standard Specification for Portland Cement.
- E. TCNA - Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
- F. ISO 13007 - International Standards Organization; Classification for Grout and Adhesives.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Samples



1. Before any ceramic tile is delivered to the job site, submit to the Commissioner sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.
 2. Submit 12" x 12" samples of waterproofing membrane.
- C. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Commissioner a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.
- D. Mock-Ups
1. At an area on the site where approved by the Commissioner, provide a mock-up ceramic tile installation.
 - a. Make the mock-up approximately 36" x 36" in dimension.
 - b. Provide one mock-up for each type, class, and color of installation required under this Section.
 - c. The mock-ups may be used as part of the Work, and may be included in the finished Work when so approved by the Commissioner.
 - d. Revise as necessary to secure the Commissioner's approval.
 2. The mock-ups, when approved by the Commissioner, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.
 3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly instructed and experienced tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.



- B. Install all ceramic tile in accordance with the recommendations contained in "Tile Council of North America Handbook for Ceramic, Glass, and Stone Tile Installation (TCNA)," latest edition.

2.2 MANUFACTURERS OF TILE

- A. Provide tile by Topcer or equal by Daltile, Summit Tile or approved equal meeting these specifications. The Commissioner reserves the right to pick tile from any price group.

2.3 WALL TILE AND BASE

- A. Provide 4x4, ceramic, unglazed, through-color, 1/4" thick, matte tile in color, material and finish per Finish Key or as selected by Commissioner.
- B. Provide sanitary cove base to match wall tile.

2.4 TRIM AND SPECIAL SHAPES

- A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

2.5 SETTING BEDS AND GROUT

- A. Portland Cement: ASTM C 150, Type 1.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: ASTM C 144, clean and graded natural sand.
- D. Latex Admixture for Mortar Bed
 - 1. MAPEI, Planicrete AC, blended with a 3:1 site mix.
 - 2. Laticrete 333.
 - 3. Pro Spec; Acrylic Additive.
 - 4. Custom Building Products; Custom Crete Thin Set Additive.
 - 5. Or approved equal.
- E. Latex-Portland Cement Bond Coat, complying with ANSI A118.4 and ISO 13007, C2ES2P2 with minimum compressive strength of 400 psi.
 - 1. MAPEI, Keralastic System thin set mortar, consisting of Kerabond dry-set mortar and Keralastic latex admixture.
 - 2. Laticrete; 211 dry-set mortar and 4237 latex admixture.



3. Pro Spec; Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture
 4. Custom Building Products; Pro-Lite.
 5. Or approved equal.
- F. Wall and Base Tile
1. Over cement board, use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, Custom Mega Flex or equal by Laticrete or Pro Spec or approved equal, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-244; coat back of board with waterproof membrane as specified below.
 2. Over glass mat water resistant gypsum backer board, use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, or equal by Laticrete or Pro Spec or approved equal, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-245.
- G. Waterproofing Membrane: Complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner; provide "Mapelastic 400" by Mapei with factory blended "Bio-Block" antimicrobial protection, "Laticrete 9235 with Microban" by Laticrete International, "B6000" by ProSpec, "9240" by Custom Building Products or approved equal.
1. Reinforce membrane with polyester fabric.
- H. Water: Clean, fresh and suitable for drinking.
- I. Grout complying with A118.7; and ISO 13007, CG2WAF: For grouting ceramic tile, provide a commercial Portland cement grout; "Ultracolor Plus" (additive not required) by MAPEI, "Permacolor Select" by Laticrete, "Prism Sure Color Grout" (additive not required) by Custom or approved equal. Add latex additive to grout as required by manufacturer; additive shall be made by same manufacturer as grout.
1. Color: As selected by Commissioner.
- J. Physical Properties: The setting beds and grouts must meet the following physical requirements:
1. Compressive Strength: 3000 psi min.
 2. Shear Bond Strength: 500 psi min.
 3. Water Absorption: 4.0% max.
 4. Service Rating (ASTM C 627): Extra Heavy Duty.
- K. Sealer: Seal all grout joints and all unglazed tile using water-based penetrating sealer.



- L. Temporary Protective Coating: Either product indicated below that is applied in the tile manufacturer's factory and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, applied hot, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg. F. per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- M. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.6 SEALANT

- A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.
- B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.
- C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.
- D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Commissioner.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.



3.3 PREPARATION

- A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at project site before installing.
- B. Field Applied Temporary Protective Coating: Pre-coat tile with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.4 JOINTS IN TILE WORK

- A. Joint Widths: 1/16" wide in ceramic tile.
- B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by the Commissioner.
- C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.
 - 1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to ceramic tile.

3.5 INSTALLATION

- A. Comply with the following installation standards:
 - 1. Wall tile over cement board or glass mat backer board using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES2P2.
- B. Backs of tile must be cleaned before installation.
- C. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.
- D. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
 - 1. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
 - 2. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.
- E. Waterproofing Membrane: Install the membrane in strict accordance with manufacturer's written recommendations.



- F. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.
- G. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
- H. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.
- I. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.6 CLEANING AND PROTECTION OF CERAMIC TILE

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to ensure removal of all cleaning material.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.
- C. Before final inspection, remove protective coverings from tile surfaces.
- D. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

END OF SECTION 09 30 13



**Department of
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SECTION 09 67 23

RESINOUS FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes resinous flooring and base for Mechanical Equipment Room and wherever else noted on Finish Schedule.
- B. Related Sections
 - 1. Section 03 30 00 "Cast-in-Place Concrete"
 - 2. Section 22 13 19 "Sanitary Waste Piping Specialties" for floor drains.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.
 - 1. Submit three (3) 2-1/2" x 4" samples of each material specified herein with color from color chart selection designated by the Commissioner.
- C. Material certificates signed by manufacturer certifying that the composition flooring complies with requirements specified herein.
- D. Maintenance written instructions for recommended maintenance practices.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Installer Qualifications: Engage an experienced Installer or applicator who has specialized in installing flooring types similar to that required for this Project and who is acceptable to manufacturer of primary materials.
- C. Single-Source Responsibility: Obtain resinous flooring materials, including primers, resins, hardening agents, and finish or sealing coats, from a single manufacturer.



1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and directions for storage and mixing with other components.
- B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Comply with resinous flooring manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect Work.

1.7 WARRANTY

- A. Provide manufacturer's warranty with flashing endorsement, signed by manufacturer, and warranting flooring materials against failures resulting from normal exposure for a period of three (3) years.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Subject to compliance with the requirements of this specification, resinous flooring shall be:
 - 1. Stonclad GS with Stonproof ME 7 and Stonkote GS4 as manufactured by Stonhard Corp. at nominal 3/16" thick.
 - 2. Tnemec 237/237C Power Tread, (1/16"), 206 Subflex EP (30-40 dft) and 280 Tneme Glaze (10-15 dft).
 - 3. Dex-O-Tex M-E Flooring System membrane and Floor Finish as manufactured by Crossfield Products Corp. at nominal 3/16" thick.
 - 4. Sherwin Williams (G-P) EPO-Flex MER III Mechanical Equipment Room System.
 - 5. Or approved equal.

2.2 SUPPLEMENTAL MATERIALS

- A. Flashing, Sheets, Cant Strips and Accessories: Types as recommended by flooring materials manufacturer, supplied for locations indicated and for locations recommended by manufacturer.



PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where resinous flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

3.3 PREPARATION

- A. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.
- B. Concrete Surfaces: Shot-blast, acid etch or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free of laitance, glaze, efflorescence, and any bond-inhibiting curing compounds or form release agents. Remove grease, oil, and other penetrating contaminants. Restore damaged and deteriorated concrete to acceptable condition. Leave surface free of dust, dirt, laitance, and efflorescence.
- C. Materials: Prepare materials according to flooring system manufacturer's instructions.
- D. Starting of work implies acceptance of slab.

3.4 APPLICATION

- A. General: Apply each component of resinous flooring system according to manufacturer's directions to produce a uniform monolithic flooring surface at the nominal thickness required.
 - 1. Start installation of flooring only in presence of manufacturer's technical representative who must approve (in writing to the Commissioner) condition of the prepared floor slab.
- B. Flooring system shall include the following minimum applications:
 - 1. Detail all cracks and control joints according to manufacturer's requirements.
 - 2. Bonding coat per manufacturer's requirements.
 - 3. Membrane coat per manufacturer's requirements.
 - 4. Reinforcement fabric as required by manufacturer.
 - 5. Smoothing coat for reinforced membrane systems as required by manufacturer.



6. Wear course as required by manufacturer.
7. Topcoat/Sealer: One or two topcoats as required by manufacturer.

3.5 TESTING

- A. Test installation for leaks immediately after nominal cure of the completed flooring. Flood each area to a depth of one inch for 24 hours. Restore all leaking areas and repeat test until no leakage is observable.

3.6 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.

END OF SECTION 09 67 23



SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section includes:

1. Prime painting unprimed surfaces to be painted under this Section.
2. Painting all items furnished with a prime coat of paint, including touching up or restoring of abraded, damaged or rusted prime coats applied by others.
3. Painting all ferrous metal (except stainless steel) exposed to view.
4. Painting all galvanized ferrous metals exposed to view.
5. Painting interior concrete block exposed to view.
6. Painting gypsum drywall exposed to view.
7. Painting of wood exposed to view, except items which are specified to be painted or finished under other Sections of these specifications. Back painting of all wood in contact with concrete, masonry or other moisture areas.
8. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
9. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
10. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
11. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

B. Related Sections



1. Shop priming is required on some, but not all of the items scheduled to be field painted. Sections including shop primed items include, but are not limited to, the following:
 - a. Section 05 50 00 – Metal Fabrications
 - b. Section 08 11 13 - Hollow Metal Doors and Frames
 - c. Section 08 31 13 - Access Doors and Frames
2. Shop Coat on Machinery and Equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished. All items of equipment furnished with prime coat finish shall be finish painted under this Section.
3. Color Coding of Mechanical Piping and Electrical Conduits
 - a. Section 22 11 13 - Facility Water Distribution Piping and Meter
 - b. Section 23 31 13 - Metal Ducts
 - c. Section 26 05 33 - Raceways and Boxes for Electrical Systems
 - d. Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

1.3 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.
- B. Factory-finished toilet partitions.
- C. Non-ferrous metals, except for items specified and/or indicated to be painted.
- D. Finished hardware, excepting hardware that is factory primed.
- E. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Materials List: Submit a complete list of materials proposed to be furnished and installed under this portion of the work.
- C. Samples
 1. Samples for Initial Selection: Accompanying the materials list, submit samples of the full range of colors available in each of the proposed products.
 2. Samples for Verification: Submit samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.



1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Job Mock-Up
 - 1. In addition to the samples specified herein to be submitted for approval, apply in the field, at their final location, each type and color of approved paint materials, applied 10 feet wide, floor to ceiling of wall surfaces, before proceeding with the remainder of the work, for approval by the Commissioner. Paint mock-ups to include door and frame assembly.
 - 2. These applications when approved will establish the quality and workmanship for the work of this Section.
 - 3. Repaint individual areas which are not approved, as determined by the Commissioner, until approval is received. Assume at least two paint mock-ups of each color and gloss for approval.
- C. Qualification of Painters: Use only qualified painters for the mixing and application of paint on exposed surfaces.
- D. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Provide barrier coats over incompatible primers or remove and re-prime as required.

1.6 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five (85) percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.1 PAINT MANUFACTURERS

- A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4). These



companies are Benjamin Moore, Akzo Nobel Paint (Glidden Professional), Sherwin Williams (S-W) or approved equal. Comply with number of coats and required minimum mil thicknesses as specified herein.

2.2 MATERIALS

- A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- B. Colors and Glosses: All colors and glosses shall be as per finish schedule or as selected by the Commissioner. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Commissioner. Color schedule (with gloss) shall be furnished by the Commissioner. Colors include, but are not limited to, the following:
- C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.
- D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.
- E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.
- F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than four (4) lbs. of gum per gallon of alcohol.
- G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.
- H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

2.3 GENERAL STANDARDS

- A. Painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.
- B. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.
- C. Paint shall arrive on the job color-mixed except for tinting of undercoats and possible thinning.
- D. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.



2.4 SCHEDULE OF FINISHES

- A. Paint on Exterior Steel Surfaces, including but not limited to: structural steel (stair 2), steel stair guards (with SS handrails), Hollow metal entry doors north and south and steel panels adjacent to entry doors.

1. Surface Preparation: SSPC-SP6 Commercial Blast
2. Provide the following system by Tnemec or comparable system by International Protective Coatings, Carboline, Akzo, Cortech/Moore, Sherwin-Williams or approved equal:
 - a. Coat 1: Tnemec Series 394 PerimePrime at 2.5-3.5 mils DFT (shop applied)
 - b. Coat 2: Tnemec Series 27 Typoxy at 4-6 mils DFT
 - c. Coat 3: Tnemec Series 1075U EnduraShield at 2-3 mils DFT
3. Coordinate shop applied primer (Series 394) with structural steel specification to ensure steel fabricator applies correct primer.

- B. Interior Ferrous Metal

1. Satin Finish/Latex
 - a. Primer:
 - 1). 1 coat Ben Moore Alkyd Metal Primer (Z06)
 - 2). 1 coat Akzo Devflex 4020 PF DTM Prime/Flat Finish or touch-up shop primer
 - 3). 1 coat Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer B66-310
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec-HP DTM Acrylic Low Luster P25
 - 2). 1 coat Akzo: Glidden Professional Diamond 350 Acrylic Eggshell GP1403
 - 3). 1 coat S-W Pro-Classic Waterborne Acrylic Satin, B20
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec-HP DTM Acrylic Low Luster P25
 - 2). 1 coat Akzo: Glidden Professional Diamond 350 Acrylic Eggshell GP1403
 - 3). 1 coat S-W Pro-Classic Waterborne Acrylic Satin, B20
 - 4). or approved equal
 - d. Total DFT not less than: 3.9 mils
2. Semi-Gloss Finish/Latex
 - a. Primer:
 - 1). 1 coat Ben Moore Super Spec-HP Acrylic Metal Primer (P04)
 - 2). 1 coat Akzo Devflex 4020 PF DTM Primer/Flat Finish or touch-up shop primer.



- 3). 1 coat Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer B66-310
- 4). or approved equal
- b. First Coat:
 - 1). 1 coat Moore Ultra Spec HP DTM Acrylic Semi-Gloss (P29)
 - 2). 1 coat Akzo: Glidden Professional Diamond 350 Acrylic S/G GP1407
 - 3). 1 coat S-W Pro-Classic Waterborne Acrylic Semi-Gloss, B31
 - 4). or approved equal
- c. Second Coat:
 - 1). 1 coat Moore Ultra Spec HP DTM Acrylic Semi-Gloss (P29)
 - 2). 1 coat Akzo: Glidden Professional Diamond 350 Acrylic S/G GP1407
 - 3). 1 coat S-W Pro-Classic Waterborne Acrylic Semi-Gloss, B31
 - 4). or approved equal
- d. Total DFT not less than: 4.0 mils

C. Interior Concrete Block

1. Flat Finish/Vinyl Acrylic Latex over Filler

- a. Block Filler:
 - 1). 1 coat Ben Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)
 - 2). 1 coat Akzo Glidden Professional Concrete Coatings Block Filler GP 3010-1200
 - 3). 1 coat S-W Preprite Block Filler, B25W25
 - 4). or approved equal
- b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Flat Latex (N536)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Flat, B30-2600
 - 4). or approved equal
- c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Flat Latex (N536)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Flat, B30-2600
 - 4). or approved equal
- d. Total DFT not less than: 10.7 mils

2. Eggshell Finish/Vinyl Acrylic Latex Over Filler

- a. Block Filler:
 - 1). 1 coat Ben Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)
 - 2). 1 coat Akzo Glidden Professional Concrete Coatings Block Filler GP 3010-1200
 - 3). 1 coat S-W Preprite Block Filler, B25W25
 - 4). or approved equal



- b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Eggshell (N538)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP1403
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Eggshell, B20-2600
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Eggshell (N538)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP1403
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Eggshell, B30-2600
 - 4). or approved equal
 - d. Total DFT not less than: 10.9 mils
3. Semi-Gloss Finish/Vinyl Acrylic Latex over Filler
- a. Block Filler:
 - 1). 1 coat Ben Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)
 - 2). 1 coat Akzo Glidden Professional Concrete Coatings Block Filler GP 3010-1200
 - 3). 1 coat S-W Preprite Block Filler, B25W25
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Gloss (N540)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic S/G GP 1407
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex S. Gloss, B31-2600
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Gloss (N540)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic S/G GP 1407
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex S. Gloss, B31-2600
 - 4). or approved equal
 - d. Total DFT not less than: 10.7 mils

D. Interior Drywall

- 1. Flat Finish/Vinyl Acrylic Latex
 - a. Primer:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Primer (N534)
 - 2). 1 coat Akzo Glidden Professional Gripper GP 3210
 - 3). 1 coat S-W Promar 200 Interior Latex Primer
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Latex Flat (N536)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201



- 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Flat, B30-2600
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Latex Flat (N536)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Flat, B30-2600
 - 4). or approved equal
 - d. Total DFT not less than: 3.6 mils
 2. Eggshell Finish/Vinyl Acrylic Latex
 - a. Primer:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Primer (N534)
 - 2). 1 coat Akzo Glidden Professional Gripper GP 3210
 - 3). 1 coat S-W Promar 200 Interior Latex Primer,
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Eggshell (N538)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Egg-Shell, B20-2600
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Ultra Spec 500 Interior Latex Eggshell (N538)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
 - 3). 1 coat S-W Promar 200 "O" VOC Interior Latex Egg-Shell B20-2600
 - 4). or approved equal
 - d. Total DFT not less than: 3.8 mils
- E. Interior Painted Wood:
1. Satin Finish/Latex
 - a. Primer:
 - 1). 1 coat Ben Moore Advance Waterborne Int. Alkyd Primer (790)
 - 2). 1 coat Akzo Glidden Professional Gripper GP 3210
 - 3). 1 coat S-W Premium Wall and Wood Primer B28W111
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Moore Advance Waterborne Int. Alkyd Satin (792)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
 - 3). 1 coat S-W Pro Classic Interior WB, Acrylic/Alkyd Classic B20.
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Advance Waterborne Int. Alkyd Satin (792)



- 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
 - 3). 1 coat S-W Pro Classic Interior WB, Acrylic/Alkyd Classic B20.
 - 4). or approved equal
 - d. Total DFT not less than: 4.0 mils
2. Semi-Gloss Finish/Latex
- a. Primer:
 - 1). 1 coat Ben Moore Advance Waterborne Int. Alkyd Primer (790)
 - 2). 1 coat Akzo Glidden Professional Gripper GP 3210
 - 3). 1 coat S-W Premium Wall and Wood Primer B28W111
 - 4). or approved equal
 - b. First Coat:
 - 1). 1 coat Ben Moore Advance Waterborne Int. Alkyd (793)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic S/G GP 1407
 - 3). 1 coat S-W Pro Classic Interior WB, Acrylic/Alkyd Classic Semi-Gloss B31
 - 4). or approved equal
 - c. Second Coat:
 - 1). 1 coat Ben Moore Advance Waterborne Int. Alkyd (793)
 - 2). 1 coat Akzo Glidden Professional Diamond 350 Acrylic S/G GP 1407
 - 3). 1 coat S-W Pro Classic Interior WB, Acrylic/Alkyd Classic Semi-Gloss B31
 - 4). or approved equal
 - d. Total DFT not less than: 3.8 mils

2.5 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

- A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.
- B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.
- C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one (1) coat Acrylic Latex Flat.
- D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two (2) coats Latex Semi-Gloss.
- E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.
- F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.



- G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.
- H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL WORKMANSHIP REQUIREMENTS

- A. Application may be by brush or roller. Spray application only upon acceptance from the Commissioner in writing.
- B. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- C. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- D. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- E. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage.
- F. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

3.3 PREPARATION OF SURFACES

- A. Metal Surfaces
 - 1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
 - 2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with mineral spirits. For aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.



- a. Bare metal to receive high performance coating specified herein must be blast cleaned SSPC SP-6 prior to application if field applied primer; coordinate with steel trades furnishing ferrous metals to receive this coating to ensure that this cleaning method is followed.
 3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
 4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.
 5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.
- B. Plaster Surfaces: Scrape off all plaster nibs or other projections and sand smooth or finish to match adjoining surface texture. Cut out all scratches, cracks, holes, depressions and similar voids and fill with non-shrinking grout, spackles, patching plaster or other approved patching material; allow to dry, refill if necessary, then sand smooth (or refinish) to provide a flush, smooth surface of the same texture as the adjacent plaster surface.
1. Allow at least 28 days, from installation of final plaster coat, before starting work.
- C. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in Section 09 29 00, "Gypsum Board."
- D. Wood Surfaces: Sand to remove all roughness, loose edges, splinters, or splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.
- E. Block Masonry Surfaces: Thoroughly clean off all grit, grease, dirt mortar drippings or splatters, and other foreign matter. Remove nibs or projections from masonry surfaces. Fill cracks, holes or voids, not filled under Section 04 20 00, Unit Masonry, with Portland cement grout, and bag surface so that it has approximately the same texture as the adjacent masonry surface.
- F. Testing for Moisture Content: Contractor shall test all plaster, masonry, and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds seven (7) percent as measured by the electronic moisture meter.
- G. Touch-Up: Prime paint all patched portions in addition to all other specified coats.



3.4 MATERIALS PREPARATION

- A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- C. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.5 APPLICATION

- A. General: Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.
 - 1. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
 - 2. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
 - 3. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convactor covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
 - 4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.
 - 5. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.
 - 6. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.



7. Enamel finish applied to wood or metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.
 8. Paste wood filler applied on open grained wood after beginning to flatten, shall be wiped across the grain of the wood, then with a circular motion, to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface with the grain until smooth before applying specified coat.
- B. Prime Coats: Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- C. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
- D. Touching-Up of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To touch up, the Contractor shall use the factory finished material manufacturer's recommended paint materials to restore abraded, chipped, or otherwise defective surfaces.

END OF SECTION 09 90 00



**Department of
Design and
Construction**

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SECTION 10 11 00

VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Bulletin boards and cases.
 - 2. Markerboards.
 - 3. Frames, trim and accessories.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.
- C. Shop Drawings: Submit for each type of visual display surface. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.
- D. Samples: Submit full range of color samples for each type of visual display surface, trim and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members for color verification after selections have been made.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Qualifications of Installers: For installation of visual display surfaces, use only personnel who are thoroughly instructed and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.



- C. Installation Methods: The recommended installation methods of the manufacturer shall become the basis for acceptance or rejection of actual installation methods used in the work.
- D. Manufacturer: Furnish all visual display surfaces by one manufacturer for entire project.

PART 2 PRODUCTS

2.1 BULLETIN BOARD AND CASE

- A. Bulletin Board and Case: Factory-fabricated unit including manufacturer's standard cabinet with tack assembly insert on back inside surface and glazed doors at front.
 - 1. Provide Hinged Door Bulletin Cases, HBS Series by Platinum Visual Systems or equal by Claridge Products and Equipment, Inc., PolyVision Corporation or approved equal.
 - a. Metal trim and accessories: HBS Series aluminum extrusions with clear satin anodized finish.
 - 1). Housing HS600: One piece aluminum housing with reinforced corners.
 - 2). Door Frame CH350: Standard channel frame with 1 3/8" face with plastic seal surrounding glass.
 - 3). Hinge: Continuous stainless steel piano hinge.
 - 4). Lock: Tumbler lock.
 - b. Back Panel: Vinyl cork tackboard.
 - c. Size: As shown on drawings.
 - d. Color: As selected by Commissioner from manufacturer's standard colors.
- B. Materials
 - 1. Vinyl Face Sheets: Vinyl surface will be Type II self-healing, weighing not less than 21 ounces per lineal yard. Pattern to be a Harborweave.
 - a. Vinyl shall be washable and mildew resistant.
 - 2. Core Material: 1/4" natural cork.
 - 3. Backing Material: 1/4" medium density fiberboard.
 - 4. Metal Trim and Accessories: 6063 aluminum alloy with a T5 temper.
 - 5. Glass: 1/4" tempered safety glass



2.2 MARKERBOARDS

- A. Provide Markerboards, FCS Series by Platinum Visual Systems or equal by Claridge Products and Equipment, Inc., PolyVision Corporation or approved equal.
 - 1. Metal trim and accessories: FCS Series aluminum extrusions with clear satin anodized finish.
 - a. Frame CH358: Channel frame with 3/4" face. No exposed fasteners permitted.
 - b. Chalktray CR310: Standard continuous solid magnetic chalktray with ribbed section and smoothly curved ends. Length to be 24". One per elevation.
 - c. Spline: Continuous aluminum stabilizing spline at each joint.
 - 2. Floor to Ceiling Markerboard Panels:
 - a. Panel Sizes: Width to be 4' wide with equal size panels at ends. Height to be a maximum of 12' high.
 - b. Joints: Butt joint factory-fired edges vertically to form smooth transition from panel to panel.
 - c. Splines: Panels to be factory-milled to accept aluminum stabilizing spline at each joint.
 - 3. Size: As shown on drawings.
 - 4. Color: As selected by Commissioner from manufacturer's standard colors.
- B. Materials
 - 1. Steel Face Sheets: Writing surface will be Writanium 28 gauge steel face with porcelain enamel finish fused to the steel sheet using a continuous coil process.
 - a. Markerboard surface shall be fused at a temperature of 1450 degrees and 1200 degrees, respectively.
 - b. The gloss of the writing surface will not increase more than three units when subjected to wearability tests specified in testing procedures for 30 hours.
 - 2. Core Material: 1/2" particleboard.
 - 3. Backing Material: .005" aluminum backing sheet.
 - 4. Metal Trim and Accessories: 6063 aluminum alloy with a T5 temper.
 - 5. Adhesive: As recommended by manufacturer for project conditions.

2.3 ACCESSORIES

- A. Provide clips, anchors and fasteners required for complete installation.



2.4 FABRICATION

- A. Assembly: Provide factory-assembled visual display surfaces unless field-assembled units indicated.
- B. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Commissioner. Provide manufacturer's standard vertical joint system between abutting sections of markerboard.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Deliver factory-built visual display surfaces completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Commissioner. When overall dimensions require delivery in separate units, prefit at factory, disassembled for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.
- B. Install units in locations and mounting heights as shown on drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
- C. Coordinate job-assembled units with grounds, trim and accessories. Join all parts with neat, precision fit.

3.3 ADJUST AND CLEAN

- A. Verify accessories required for each unit properly installed and operating units properly functioning.
- B. Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION 10 11 00



SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes identifying devices.
- B. Related Sections
 - 1. Section 26 50 00 "Lighting" for exit signs.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data and installation instructions for each type of identifying device required.
- C. Samples: Submit samples of each identifying device showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.
- D. Shop Drawings: Submit shop drawings for fabrication and erection of identifying devices. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. For actual installation of the identifying devices, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are experienced in the required skills.



PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide aluminum plate room identification signage as indicated on Drawings.
 - 1. Size: 7" x 7"
 - 2. 1/4" thick aluminum backplate.
 - 3. Corners: Eased.
 - 4. Finish:
 - a. Face: Non-directional brushed.
 - b. Returns: Satin brushed.
 - c. Spray clear protective coating at face and returns.
 - 5. Mounting: Tape and silicone, adhered directly to wall.
 - 6. Lettering: Raised 1/32" type in Gravotac; material to match 100% Black.
 - 7. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, matching backplate.
 - 8. Provide Typestyle set.
- B. Basis of Design Product: Subject to compliance with requirements, provide aluminum plate room identification signage manufactured by MS Signs, Inc. or a comparable product by one of the following:
 - 1. ASI Sign Systems, Inc.
 - 2. Andco Industries Corp.
 - 3. Or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install units and components at the locations directed by the Commissioner, securely mounted with concealed theft-resistant fasteners. Attach to substrates in accordance with the manufacturer's instructions.



- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces.

END OF SECTION 10 14 00



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SECTION 10 21 13

TOILET COMPARTMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Floor mounted solid polyethylene toilet partitions.
 - 2. Urinal screens.
 - 3. Panels adhered to walls at showers.
 - 4. Hardware and accessories.
- B. Related Sections
 - 1. Section 04 20 00 "Unit Masonry"
 - 2. Section 09 29 00 "Gypsum Board"
 - 3. Section 10 28 00 "Toilet, Bath and Laundry Accessories"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings: Before any of the materials of this Section are delivered to the job site, submit the following:
 - 1. Room layouts and elevations for all areas, with dimensions based on actual dimensions taken at site.
 - 2. Materials, finishes, details of construction, gauges of metal, hardware, fastening and anchoring conditions and relation to adjoining construction.
- C. Samples - Submit:
 - 1. Solid plastic panel, each color - 12" x 12".



2. All hardware and fitting items and fastenings for same. Include all items listed under 2.3 C. below.

D. Templates: Submit templates to other trades as required for support of toilet partitions.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Field Measurements: Take field measurements prior to fabrication to ensure proper fitting of the work.
- C. Inserts and Anchorages: Furnish inserts and anchoring devices which must be built into other work for the installation of toilet partitions and related work. Coordinate delivery with other work to avoid delay.

1.5 WARRANTY

- A. Provide manufacturer's written warranty covering all components against breakage, corrosion and delamination for a period of 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide floor mounted, overhead-braced, solid-polyethylene assemblies with non-corrosive doors, panels, and pilasters in Shale color and OP (orange peel) texture equal to Eclipse Partitions by Scranton Products Inc. or a comparable product by one of the following:
 1. Bradley Corporation
 2. Metpar Corp.
 3. Or approved equal.
- B. Provide wall hung urinal screens of same material as toilet partitions.

2.2 MATERIALS AND COMPONENTS

- A. Panels, doors, and pilasters shall be fabricated from high-density polyethylene (HDPE) containing a minimum of 10% recycled material manufactured under high pressure forming a single component section which is waterproof, nonabsorbent, and has a self-lubricating surface that resists marking with pens, pencils, or other writing utensils. All panels, doors, and pilasters to arrive at job-site with special protective plastic covering.



B. Characteristics

1. Dual component compression molded high-density polyethylene (HDPE) of solid Poly-Mar HD, virgin resin materials in colors that extend throughout the surface; the panels, doors, and pilasters shall have combined recycled and/or virgin material (HDPE) as the core material.
2. Doors, panels, and pilasters shall be a minimum of 1" thick and all edges machined to a radius of 0.250" and all exposed surfaces to be free of saw marks.

2.3 HARDWARE

A. Door hardware shall be as follows:

1. Hinges shall be integral hinge system. Pilaster to be machined to accept door and hinge mechanism. Hinge mechanism consists of a two-piece 1/2" diameter nylon pin with "cam action" and a 3/16" stainless steel pin inserted into lower portion of pilaster and door. A one-piece 1/2" diameter, 4" long nylon pin to be inserted into the top portion of the pilaster and door. Door closures to be factory set to accommodate all conditions and allow for a positive opening and closing action free of impediment.
 2. Each handicapped door to include (1) door pull and (1) wall stop.
 3. Door strike and keeper shall be fabricated from aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wraparound flange surface mounted and thru-bolted to pilaster with one-way sex bolts. Size of strike shall be 6" in length.
 4. Door latch housing shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish, surface mounted, and thru-bolted to door with one-way sex bolts. Slide bolt and button shall be heavy aluminum with black anodized finish.
- B. Solid color plastic pilaster shoes shall be anchored to finished floor with plastic anchors and 1-1/2" #14 stainless steel Phillips head screws.
- C. Full-length continuous plastic wall brackets (shall be solid color) weighing not less than 0.822 lbs. per linear foot. Brackets shall be used for all panels to pilaster, pilasters to wall, and panel to wall connections. Wall brackets shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment of brackets to adjacent wall construction shall be accomplished by 1-1/2" #14 stainless steel Phillips head screws anchored directly behind the vertical edge of panels and pilasters at 13" intervals along the full length of bracket and at each 13" interval alternately spaced between anchor connections.
- D. Headrail shall be heavy aluminum extrusion (6364-T5 Alloy) with bright-dipped anodized finish in anti-grip configuration weighing not less than 1.188 lbs. per linear foot. Headrail shall be fastened to tops of pilasters and headrail brackets by thru-bolting with one-way stainless steel sex bolts (no cadmium plated sex bolts allowed).



- E. Headrail brackets shall be 18 gauge stainless steel.

2.4 FABRICATION

- A. Dividing panels shall be 55" high and mounted at 14" above finished floor, unless otherwise noted.
- B. Doors shall be 55" and mounted at 14" above finished floor, unless otherwise noted.
- C. Pilasters shall be 82" high, mounted within a one-piece plastic shoe with one-way theft-proof stainless steel sex bolts.
- D. Aluminum edging strips to be fastened to the bottom edge of all doors and panels using vandal-proof stainless steel fasteners.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install work of this Section in a rigid and permanent manner, straight and plumb, with all horizontal lines level.
- B. Install panels and doors 14" above finished floor, unless otherwise indicated. Toilet compartment doors shall be centered on water closets, unless otherwise indicated.
- C. Maintain uniform clearance of approx. 1/2" between pilasters and panels, and 1/2" between pilasters or panels and finished wall.
- D. Maintain uniform clearance of 1/4" or less between vertical edges of doors and pilasters.
- E. Set pilaster units with anchorages having not less than two (2) inches penetration into structural floor. Level, plumb, and tighten installation with devices furnished. Hang doors and adjust so that tops of doors are level with tops of pilasters when doors are in closed position.

END OF SECTION 10 21 13



SECTION 10 28 00

TOILET, BATH AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes toilet accessories.
- B. Related Sections
 - 1. Section 04 20 00 "Unit Masonry"
 - 2. Section 09 29 00 "Gypsum Board"
 - 3. Section 10 21 13 "Toilet Compartments"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data, catalogue cuts and installation instructions for each toilet accessory.
- C. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work
- D. Submit schedule of accessories indicating quantity and location of each item.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- C. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to ensure proper operation and servicing of accessory units. Accessories shall be installed at heights in compliance with 2008 New York City Building Code.



- D. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.

1.5 PRODUCT HANDLING

- A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Galvanized Steel Sheet: ASTM A 653, G60.
- D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- E. Mirrors: ASTM C 1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

2.2 FASTENING DEVICES

- A. Exposed Fasteners: Theftproof type, chrome plated, or stainless steel; match finishes on which they are being used.
- B. Concealed Fasteners: Galvanized (ASTM A 123) or cadmium plated.
- C. No exposed fastening devices permitted on exposed frames.
- D. For metal stud drywall partitions, provide ten (10) gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

2.3 FABRICATION

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.
- B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.



- C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

2.4 MANUFACTURERS

- A. Provide products manufactured by Bobrick Washroom Equipment Co., American Specialties, Inc., Bradley Corp., A & J Washroom Accessories or approved equal.

2.5 ACCESSORY SCHEDULE

- A. Provide the following basis of design accessories or comparable product by one of the manufacturers listed in 2.4.A or approved equal.
 - 1. AC-H1: Washroom hook: Bobrick, B-211, exposed mounting, satin nickel-plated fin.
 - 2. AC-TPD1: Toilet paper dispenser: Bobrick B-2840, surface mounted w/ utility shelf, ss. satin-fin.
 - 3. AC-M1: Framed mirror: Bobrick B-292 2436, ss. satin-fin. frame
 - 4. AC-M2: Framed tilt mirror (ADA): Bobrick B-293-1836, ss. satin-fin. frame
 - 5. AC-PTD1: Paper towel dispenser: Bobrick B-263, surface mounted, ss. satin-fin.
 - 6. AC-SND1: Sanitary napkin disposal: Bobrick B-270, surface mounted, ss. satin-fin.
 - 7. AC-WR1: Waste receptacle: Bobrick B-2250, floor-standing, ss. satin-fin.
 - 8. AC-SCR1: Shower curtain rod: Bobrick B-6047, ss. satin-fin, w/ shower hooks: Bobrick 204-1, ss.
 - 9. AC-SS1: Shower seat (ADA): Bobrick B-5181, matte-fin. surface, ss. satin-fin. frame
 - 10. AC-G1: Grab bar: Bobrick B-5806 x 18
 - 11. AC-G2: Grab bar: Bobrick B-6806 x 30
 - 12. AC-G3: Grab bar: Bobrick B-6806 x 36
 - 13. AC-G4: Grab bar: Bobrick B-6806 x 42
 - 14. AC-HD1: Hand dryer: World dryer Air-max DM5, brushed ss finish.
 - 15. AC-MH1: Mop holder: Elkay LK403 ss.
 - 16. AC-LB1: Locker bench: Robinson Steel Company ADAWMB-SS, ss.



- a. Locations: Jan. Rm. 211 and Util. Rm. 106
- 17. AC-H2: Coat hook: Bobrick B-6827, ss. satin-fin.
- 18. AC-SD1: Soap dispenser: Bobrick B-2111. ss. satin-fin.
- 19. AC-M3: Full height mirror: Bobrick B-290 2472, ss. satin-fin. frame
- 20. AC-BB1: Bulletin board: Platinum Visual Systems (PVS) 2'x3' 8221203 bulletin board, color selected by Commisisoner.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Accessories which are to be partition mounted shall be closely coordinated with other trades, so that the necessary reinforcing is provided to receive the accessories.
- B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall and masonry partitions. Coordinate the work to ensure that base plates and anchoring frames are in the proper position to secure the accessories.
- C. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions which are at variance with those on the approved shop drawings to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of fabrication of items affected.
- D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

3.3 INSTALLATION

- A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.
- B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.
- C. Secure accessories in place, at their designated locations by means of theftproof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.



- D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Commissioner.
- E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to Commissioner.
- F. The Commissioner shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Commissioner has the right to reject any accessory if workmanship is below the standards of this project.
- G. Grab bars shall be installed so that they can support a three hundred (300) lb. load for five minutes per ASTM F 446.

END OF SECTION 10 28 00



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SECTION 10 44 13

FIRE PROTECTION CABINETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes fire extinguisher cabinets.
- B. Related Sections
 - 1. Section 04 20 00 "Unit Masonry"
 - 2. Section 09 29 00 "Gypsum Board"
 - 3. Section 21 10 00 "Water-Based Fire Suppression Systems"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data and installation instructions for fire extinguisher cabinets. Include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by the Commissioner are required, include color charts showing full range of manufacturer's standard colors and designs available.
- C. Samples: Submit samples, 6" square, of each required finish. Prepare samples on metal of same gauge as metal to be used in the work.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following:



1. Larsen's Mfg. Co.
2. J.L. Industries.
3. Potter Roemer.
4. Or approved equal.

2.2 CABINETS

- A. Recessed Cabinets: Cold-rolled steel with powder coat finish, with horizontal duo door with clear acrylic glazing; sized to fit within the partition or wall depth. Provide fire rated cabinets within fire rated partitions.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Larsen's Mfg. Co.; Model G-2409-R7 with 1-1/4" trim or comparable product by one of the following:
 - a. J. L. Industries
 - b. Potter Roemer
 - c. Or approved equal.
- B. Surface-Mounted Cabinets: Cold-rolled steel with powder coat finish, with horizontal duo door with clear acrylic glazing.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Larsen's Mfg. Co.; Architectural Series Model 2409-SM or comparable product by one of the following:
 - a. J. L. Industries
 - b. Potter Roemer
 - c. Or approved equal.
- C. Fire Extinguisher Cabinet Schedule
1. FEC1: Surface mounted on concrete wall, stainless steel.
 2. FEC2: Semi-recessed into CMU wall, baked enamel finish to match adjacent wall color.
 3. FEC2: Semi-recessed into GWB wall, baked enamel finish to match adjacent wall color.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSTALLATION

- A. Install items included in this Section in locations indicated and at heights to comply with 2008 New York City Building Code.
 - 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 - 2. Securely fasten fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

3.3 IDENTIFICATION

- A. Identify fire extinguisher cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process. Provide lettering on door as selected by Commissioner from manufacturer's standard letter sizes, styles, colors and layouts.

END OF SECTION 10 44 13



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SECTION 10 51 13

METAL LOCKERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Steel wardrobe lockers.
 - 2. Benches.
 - 3. Trim, closures, anchors and accessories.
- B. Related Sections
 - 1. Section 03 30 00 "Cast-in-Place Concrete"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Shop Drawings: Before any materials of this Section are delivered to the job site, submit complete shop drawings, technical data and installation instructions to the Commissioner. Shop drawing must show method of installation, fillers, trim and accessories. Include locker sequencing information.
- C. Samples: Submit 6" x 6" samples of manufacturer's standard finish.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Qualifications of Installers: For installation of lockers, use only personnel who are thoroughly instructed and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.
- C. Uniformity: Provide each locker as produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.



PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide single tier steel wardrobe lockers by Lyon Workspace Products listed below, or equal by Republic Storage Systems Company, Penco Products, Inc. or approved equal.
1. Type 1: Cat. No. 5104
 - a. Size: 18"w x 24"d x 78"h (with legs)
 - b. Color: As selected by Commissioner.
 - c. Handle: ADA compliant
 2. Type 2: Cat. No. 5578
 - a. Size: 24"w x 24"d x 78"h (with legs)
 - b. Color: As selected by Commissioner.
 - c. Handle: ADA compliant

2.2 MATERIALS

- A. Sheet Steel: Mild cold-rolled and leveled steel, free from buckle, scale, and surface imperfections.

2.3 FABRICATION, GENERAL

- A. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make all exposed metal edges safe to touch. Weld or rivet connections; bolted connections not permitted. Grind exposed welds flush. Do not expose rivet heads on fronts of locker doors or frames.
- B. Finishing: Chemically pretreat metal with degreasing and phosphatizing process. Apply baked-on enamel finish to all surfaces, exposed and concealed, except plates and non-ferrous metal.
1. Color: Provide locker units in color(s) as selected by Commissioner from manufacturer's standards. Concealed parts may be manufacturer's standard neutral color.
- C. Door Frames: Frames shall be 16 gauge formed in a channel shape. Vertical members shall have additional flange to provide a continuous door strike. Cross frame members shall also be 16 gauge channel shaped, including intermediate cross frames on double and triple tier lockers.
- D. Doors: Doors shall be 16 gauge, with louvers for ventilation; channel shaped on both the lock and hinge side, with angle formations across the top and bottom.
- E. Body: Bottoms shall be 16 gauge. Tops, sides, backs, and shelves shall be 24 gauge. Bolt spacing shall not exceed 9" o.c.



- F. Hinges: Hinges shall be full length 16 gauge continuous piano type riveted to both door and frame.
- G. Handles: Handles shall be one-piece 20 gauge deep drawn stainless steel cup designed to accommodate locks.
- H. Latching: Lifting trigger shall be 14 gauge steel, attached to the latching channel. The trigger shall have a padlock eye for use with 9/32" diameter padlock shackle. Doors to have latch clip engaging frame at three points on doors over 42" high and two points on all other doors. Locking device to be positive automatic type, whereby locker door may be locked when open, then closed without unlocking. A rubber silencer shall be firmly secured to the frame at each latch hook.

2.4 LOCKER ACCESSORIES

- A. Equipment: Furnish each locker with hat shelf, hang rod, and not less than 2 single-prong wall hooks.
 - 1. Type 1: Provide 1 double and 3 single prong hooks.
 - 2. Type 2: Provide 1 double and 4 single prong hooks.
- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous metal number plates with numerals not less than 3/8" high. Number lockers in sequence as directed by Commissioner. Attach plates to each locker door, near top, centered, with at least 2 fasteners of same finish as number plate.
- C. Continuous Sloping Tops: Not less than 20 ga. sheet steel, approx. 25 degree pitch, in lengths as long as practicable but not less than 4 lockers. Provide closures at ends. Finish to match lockers, unless otherwise indicated.
- D. Filler Panels: Provide filler panels where required of not less than 16 ga. steel sheet, factory-fabricated and finished to match locker units.

2.5 LOCKER ROOM BENCHES

- A. Bench Tops: Manufacturer's standard 1-piece units 14 inch wide by 1-1/4 inches thick, with rounded corners and edges, fabricated from laminated maple with one coat of clear sealer on all surfaces, and two coats of clear lacquer on top and sides.
- B. Freestanding Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top, complete with fasteners and anchorage, and as follows
 - 1. Freestanding Isosceles Trapezoid Base: 1/4-inch-thick by 3-inch-wide anodized aluminum bar stock, shaped into isosceles trapezoidal form; with nonskid rubber pads at bottom. Provide minimum two pedestals for each bench. Maximum spacing 6 feet.
 - 2. Size: 14 inches wide and 16-1/2 inches high.



- C. Custom Bench Sizes: Length and width as indicated on the Drawings.
 - 1. Stain Color: As selected by the Commissioner.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid and flush installation.
- B. Space fastenings 36" o.c. and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal all fasteners.
- C. Install trim, sloping top units, and metal filler panels using concealed fasteners to provide flush, hairline joints against adjacent surfaces.
- D. Install benches to comply with manufacturer's instructions in such a manner that they resist a 200 lb. load applied laterally to benches.

3.3 ADJUST AND CLEAN

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 51 13



SECTION 10 56 13

METAL STORAGE SHELVING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes metal storage shelving.
- B. Related Sections
 - 1. Section 04 20 00 "Unit Masonry"
 - 2. Section 09 29 00 "Gypsum Board"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data
 - 1. Manufacturer's catalogue and specifications.
 - 2. Recommended installation procedures.
- C. Shop Drawings
 - 1. Elevations and sections.
 - 2. Method of anchoring and connecting to surrounding construction.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Products shall be standard best quality for the particular kind of material required.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver storage shelving in ample time to facilitate the work of this Section.
- B. Take care to protect components during handling and storage.



PART 2 PRODUCTS

2.1 MATERIALS

- A. Storage shelving shall be cantilever type, adjustable, open front shelving with no posts.
 - 1. Size and configuration: As indicated on the Drawings.
 - 2. Color: As selected by Commissioner from manufacturer's standard range.
- B. Provide "Cantilever Shelving and Hardware" by E-Z Shelving Systems, Inc. or equal by Penco Products, Inc., Lyon Metal Products or approved equal.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Comply with manufacturers' installation procedures.
- B. Install storage shelves square, level and true anchoring firmly to walls.
- C. Install required accessories as recommended by the manufacturer.

3.3 ADJUST AND CLEAN

- A. Clean and leave free from blemishes, defects and dirt. Use only cleaning agents recommended by the manufacturer.
- B. Adjust hardware and accessories for maximum efficiency.

END OF SECTION 10 56 13



SECTION 12 24 13

ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Manually-operated window shades.
 - 2. Field measurements of as-built conditions.
 - 3. Accessories and hardware required for complete installation and operation.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- C. Shop Drawings: Submit floor layout and elevations, indicating location of all window treatments, mechanism details, type and size of each unit, type and location of controls. Shop drawings must also show seaming of shade fabric. Submit shop drawings showing details of installation and relation to adjoining construction and conditions.
- D. Samples: Submit full size sample of each shade type.
- E. Mock-Up
 - 1. Install each type of shade assembly on one complete column bay for Commissioner's acceptance of installation details, workmanship and operation.
 - 2. Approved mock-up shall be used as the standard for installation of work under this Section, and no further installation work shall proceed before Commissioner's acceptance of the mock-up.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



- B. Provide assemblies which are complete assemblies produced by one manufacturer, including hardware, accessory items, mounting brackets, and fastenings.
- C. Provide materials in colors as selected by the Commissioner from manufacturer's standard colors.

1.5 WARRANTY

- A. Manufacturer's standard non-depreciating 25-year limited warranty covering all hardware, chains, and shade cloth.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect shades from damage, soiling and deterioration during transit, storage and handling to, until City of New York's acceptance.

PART 2 PRODUCTS

2.1 MANUALLY OPERATED SHADES

- A. Provide manually operated shade system equal to "Mechoshade/5 System," made by the Mecho-Shade Corp. or equal made by Sol-R-Veil Inc., Draper, or approved equal conforming to standards specified herein.
- B. Shade system shall be pre-engineered overrunning clutch design that disengages to 90% during the raising and lowering of the shade. The brake can stand a pull force of 40 lb. in the stop position. Requires no adjustment. Self-lubricating hub on to which the brake system is mounted includes an articulated brake assembly which ensures smooth, non-jerky operation in raising and lowering the shades. System shall include the following components:
 - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 - 2. Provide shade hardware that allows for removal and remounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 - 3. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
 - 4. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
 - 5. Provide shade hardware system that allow for operation of multiple shade bands (multi-banded shades) by a single chain operator. Connectors shall be offset to ensure alignment from the first to the last shade band.



6. Provide shade hardware constructed of minimum 1/8" thick plated steel or heavier as required to support 150% of the full weight of each shade.
 7. Drive Bracket/ Brake Assembly:
 - a. MechoShade Drive Bracket M5 or equal by other manufacturers noted herein.
 - b. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. minimum breaking strength. Nickel plate chain shall not be accepted.
- C. Fascia: Extruded aluminum in shape shown on drawings, baked enamel white finish.
- D. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Hem Pockets and Hem Weights: Fabric hem pocket with RF welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be the same, for all shades within one room.
 2. Shade Band and Shade Roller Attachment:
 - a. Provide extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without deflection. Provide for positive mechanical engagement with drive/ brake mechanism.
 - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/ replaceable with a snap-on/snap-off spline mounting, without having to remove shade roller from shade brackets.
 - c. Mounting spline shall not require use of adhesives, adhesive tapes, staples and/or rivets.

2.2 SHADE CLOTH

- A. Basis-of-Design Product: Subject to compliance with requirements, provide MechoShade; Thermoveil Dense Privacy Weave 900 Series, Openness factor 0-1%, color 0903 Grey, or comparable product by one of the following:
1. Sol-R-Veil Inc.
 2. Draper.
 3. Or approved equal.

2.3 FABRICATION

- A. The shade and the fabric shall hang flat without buckling or distortion. The edge, when trimmed, shall hang straight without curling or raveling. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than +/- 1/8" in either



direction due to warp distortion or weave design. Shades shall fill window openings from head to sill and jamb to jamb.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION: GENERAL

- A. Coordinate with the work of other trades to ensure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the indicated design and the installation recommendations of the manufacturer as approved by the Commissioner.
- C. Upon completion of the installation, put all components through at least ten (10) complete cycles of operation, adjusting as necessary to achieve optimum operation.

3.3 INSTALLATION OF MANUAL ROLLER SHADES

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions and located so shade band is not closer than 2" to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturers written instructions.

END OF SECTION 12 24 13



SECTION 13 31 33

FRAMED FABRIC STRUCTURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes tensioned fabric structures including, but not limited to, the following principal items:
1. The architectural membrane as indicated on the drawings and in these specifications.
 2. Cables and end fittings.
 3. Perimeter, catenary, and sectionalized aluminum clamping system.
 4. Structural steel, including masts, trusses, struts, beams, and/or weldments, as indicated on the drawings.
 5. Fasteners and gasketing.
- B. The Contractor will be responsible for the engineering, detailing, fabrication, supply, and installation of the Work specified herein. The intent of this specification is to establish in the first instance an undivided, single-source responsibility of the Contractor for all of the foregoing functions.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM).
1. ASTM A 586 – Standard Specification for Zinc-Coated Parallel and Helical Steel Wire Structural Strand.
 2. ASTM A 603 – Standard Specification for Zinc-Coated Steel Structural Wire Rope
 3. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 4. ASTM E 108 – Standard Test Methods of fire Tests of Roof Coverings.
 5. ASTM E 136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg. C.



1.4 PERFORMANCE REQUIREMENTS

- A. Comply with the New York City Building Code project has been filed under, particularly as regards wind loading and seismic loading, and snow loading if applicable.
- B. Engineer, fabricate, and install custom tensioned fabric and steel support structures in accordance with the design intent as indicated on the Drawings and as specified herein. Any changes required to the design requires approval by the Commissioner prior to commencement of construction.
- C. Perform structural analysis of tensioned fabric and steel support structures by Professional Engineer licensed in the State of New York with experience in membrane structures using large displacement finite element techniques. Utilize this analysis to prepare shop drawings.
- D. Ensure structural integrity is maintained for life-safety issues in the event of a tear developing in the fabric.
- E. Engineer tensioned fabric structures to ensure tensioned fabric has a smooth uniform surface with even curved edges without wrinkling, cuts, abrasions, stains, marks, or surface defects.
- F. Fire Performance
 - 1. Burning Characteristics (ASTM E 84)
 - a. Flame Spread 5 max.
 - b. Smoke Generation (Tunnel Test) 20 max.
 - 2. Fire Resistance of Roof Coverings (ASTM E 108)
 - a. Burning Brand Class A
 - 3. Incombustibility of Substrates (ASTM E 136)
 - a. Substrate Noncombustible Pass
 - 4. Flame Resistance (NFPA 701 Small Scale, UL 94).
 - a. Flame Out 1 second after
 - b. Char Length 0.25-inch max.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data, catalog cuts, and installation instructions for each component of the tensioned fabric structures.



- C. Shop Drawings: Shop drawings are to be wholly created by the contractor in CAD, drawn to scale and fully dimensioned, and specific to the project showing all typical and unique conditions. Do not submit copies of the design drawings, manufacturer's typical details, or details from industry standard publications as shop drawings. Shop drawings are to show all materials intended for installation and integration with work by adjacent trades. Shop drawings are to show conditions listed herein, including, but not limited to:
1. Submit shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data. Include placing drawings for steel members (posts, poles, cables, etc.) showing size and gauge designations, number, type, location and spacing. Indicate supplemental bracing, splices, accessories and details as may be required for proper installation.
 2. Shop drawing shall define the complete structure, except interface geometry determination and definitions, coordination between fabric and structural supports, reaction loads imposed by fabric roof, connections, details, and interfaces to the base foundation support.
 3. Shop drawings must be prepared, signed and sealed by a Professional Engineer licensed in the State of New York
- D. Engineering Data:
1. Submit Engineering Data drawings to the Commissioner for review. The manufacturer is responsible for the structural design and supports for the tensioned fabric structures, and must show the proposed system and how the Performance Criteria is accommodated on these drawings.
 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared, signed and sealed by a Professional Engineer licensed in the State of New York.
- E. Quality Assurance Submittals: Submit the following:
1. Qualifications: Proof of manufacturer, installer, and welder qualifications.
 2. Structural design calculations.
 3. Manufacturer's installation instructions for framing members and fabric.
- F. Samples: Submit samples of materials that demonstrate product type, color and finish.
1. Submit 12 inches x 12 inches sample of fabric.
 2. Submit 12 inches x 12 inches sample showing reinforcement.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



- B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in other construction; coordinate delivery with other work to avoid delay.
- C. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to ensure proper operation and servicing of accessory units.

1.7 PRODUCT HANDLING

- A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

1.8 WARRANTY

- A. Workmanship: 1 year.
- B. Fabric: Manufacturer's standard fabric warranty, 10 years minimum.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide a framed fabric structure by Fabric Structures USA (type and model described herein) or comparable product by one of the following:
 - 1. Clear Span Structures
 - 2. Pavilion Structures USA
 - 3. Or approved equal.

2.2 ENGINEERED TENSIONED FABRIC STRUCTURES

- A. Tensioned Fabric Canopy System
 - 1. Structural Fabric: 28 oz. PVC, white
 - 2. Cables and End Fittings: All cables shall be Class A zinc coated. Cables in contact with fabric shall be PVC coated.
 - a. Structural Wire Ropes Cables: ASTM A 603.
 - b. Structural Strand Cables: ASTM A 586.
 - c. 7-Wire Prestressing Strand: ASTM A 416, Grade 270.
 - 3. Steel Supports: Comply with Section 051200, "Structural Steel."
 - 4. All fabric, fittings, posts, poles, cables and connections shall be provided by the manufacturer as a complete engineered system.



5. The fabric structure must:
 - a. Have a base fabric that passes as noncombustible in accordance with ASTM E 136 (Incombustibility of Substrate).
 - b. Have resistance to exterior fire exposure consistent with the overall construction classification in accordance with ASTM E 108 (Fire Resistance of Coverings).
 - c. Have a resistance to spread of flame and limit smoke generation for interior finishes consistent with classification of the structure in accordance with ASTM E 84 (Surface Burning Characteristics).
6. Provide calculations for all system elements signed and sealed by a Professional Engineer licensed in the State of New York. Calculations shall include all foundation reactions.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSPECTION

- A. Examine the areas and conditions where tensioned fabric roof system is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 FABRICATION OF MEMBRANE PANELS, GENERAL

- A. Membrane assembly shop drawings shall include all information necessary for the fabrication by the Contractor of the tensile membrane structure. They shall include size and shape of envelope, type and location of shop and field connections, size, type, and extent of all heat-welded seams.
- B. The Contractor shall take necessary care to plan and assemble the fabricated sections such that the assembly has no shop patches. Splices, if any, shall be patterned into a symmetrical and repetitive geometric arrangement within the assembly, shown on the shop drawings and, where feasible, hidden by structural members.
- C. All fabricated joints shall have a minimum of 90% of the total strength of the coated membrane in strip tensile testing. All structural joints shall be fused in accordance with industry standards and shall maintain the integrity of the coating. PTFE-coated woven fiberglass membranes shall be heat-sealed only.
- D. Biaxial Test: At least one (1) representative sample of the outer membrane shall be biaxially test loaded. Membrane compensation in patterning shall be based upon the results of the biaxial test loading.



3.4 ERECTION OF MEMBRANE ASSEMBLIES

- A. Prior to installation of the membrane assemblies, the Installer to meet with Contractor and Commissioner to review the erection procedure and scheduling. The Contractor shall coordinate all work with other trades.
- B. No trade shall have access to, or work from the membrane, unless authorized by the Commissioner in writing.
- C. Erection of Structural Steel.
 - 1. The Contractor shall employ a competent foreman to supervise all work of steel erection. This foreman shall be present at all times during the Contractor's scope of work.
 - 2. All precautions shall be taken to ensure an accurately located and completely safe and stable structure at all times. Adequate guy cables shall be used throughout the work and all erection bolts shall be drawn up tight.
 - 3. All steel shall be accurately aligned before permanent connections are made.
 - 4. Temporary bracing shall be left in place as long as may be required for safety. The bracing shall be located so it does not interfere with the erection of the tensile membrane structure, and can be removed as required during construction.
 - a. The structure is to be self-supporting and stable after the building is fully completed. It is the Contractor's sole responsibility to determine the erection procedure and sequence and to ensure the safety of the building and its component parts during erection. This includes the addition of whatever temporary bracing, guys or tie-downs that may be necessary. Such materials shall be removed by the Contractor and remain the Contractor's property after completion of the project.
 - 5. Erection tolerances shall be specified in the AISC 303-05, unless otherwise indicated.

3.5 PROTECTION AND CLEANING

- A. Protect work from damage and deterioration during installation.
- B. Upon completion of tensile membrane structure installation:
 - 1. The Contractor shall clean all surfaces of the system's components in conformance with the membrane manufacturer's recommendations.
 - 2. Inspect the system and restore membrane panels that have become damaged. Restoration shall be executed in such a way that it is visually acceptable.

END OF SECTION 13 31 33



SECTION 14 24 00 - HYDRAULIC ELEVATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENT:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (the City of New York Standard Construction Contract).

1.2 SUMMARY

- A. These specifications are intended to cover the complete installation of one (1) twin jack holeless hydraulic elevator designated "PE-1".

1.3 RELATED WORK

- A. A mainline fused disconnect switch shall be provided for the elevator. The mainline disconnect switch shall be located approximately 18" from the strike side of the machine room door and 52" above the floor. Provide an auxiliary contact for battery lowering device.
- B. 110 Volt circuit breaker panel with lockout capabilities.
- C. Machine room lighting with the light switch located directly adjacent to the strike jamb and two (2) 20 AMP G.F.I. outlets.
- D. A phone line circuit in the machine room for emergency communications (24 hour emergency communications to an accessible location must be provided.).
- E. Adequate mechanical ventilation of machine room and/or machinery space to maintain temperature between 55°F and 90°F. and not to exceed 85% relative humidity.
- F. Provisions for natural ventilation directly to the outside air.
- G. A weather resistant type lighting fixture and G.F.I. outlet in the elevator pit. (The bulb must be protected by a grounded metal guard or lexan cover.) The switch shall be located adjacent to the strike side of the pit access door. Final locations of light, outlet and switch to be field coordinated in accordance with the elevator layout drawings.
- H. Smoke detectors as required in the elevator lobbies, machine room and hoistway including wiring and activation signals brought to the elevator machine room terminating in a junction box located adjacent to the elevator controller.
- I. Enclosed and protected machine room and/or machinery space. Minimum machine room height shall be 8' - 0".



- J. Access to machine room and/or machinery space to be a minimum of 3' – 6" wide by 6' – 8" high and shall be self-closing and locking. The lock shall be non-canceling and operate from within the room without the use of a key.
- K. Clear hoistway plumb from top to bottom with variations not to exceed one 1" at any point in the first 100 feet. Tolerance may increase at 1/32" for each additional ten (10) feet up to a maximum displacement of 2".
- L. Beveled guards are required for projections, recesses and setbacks in the hoistway that project more than 2" inside the general line of the hoistway on sides not used for loading or unloading.
- M. Hoistway protection in case of fire. (Two (2) hour rated enclosure or as required by the Building Code of the City of New York.)
- N. Supports for guide rail fastenings at each floor and/or intermediate supports. Provisions for bracket spacing should not exceed 10' - 0".
- O. Recesses, fireproofing and patching, as required, to accommodate hall button boxes, signal fixtures, hoistway entrance frames, etc.
- P. Vertical, noncombustible ladder for the elevator extending 42" above the sill of the access door where the pit extends more than 36" below the sill of the access door.
- Q. Dry pit including sump pit, pump or drains. Drains connected directly to sewers shall not be installed. Provide covers over sump pits or drains. Provide pump with oil minder switch and associated accessories.
- R. Pit reinforced to sustain vertical forces from guide rails, buffers and cylinders.
- S. Entrance walls for elevator are not to be constructed until door frames and sills are in place.
- T. Furnishing, installing and maintaining the required fire rating of elevator hoistway walls, including the penetration of fire wall by elevator fixture boxes.
- U. The interface of the elevator wall with the hoistway entrance assembly shall be in strict compliance with the elevator supplier's/contractor supplier's requirements.
- V. Door frames are to be anchored to walls and properly grouted in place if installed in masonry walls to maintain fire ratings. The head jamb of the entrance frames shall not be used to support the weight of the wall over the frame.
- W. Support for sills the full width of hoistway, with 2 ½" minimum recesses including grouting after sills are set in place.
- X. Stainless steel governor access door (24" x 24") at top of shaft as shown on the drawings with contact. Provide a steel access ladder.



- Y. Provide sill support angles.
- Z. Refer to the drawings for additional related work items.
- AA. Refer to all Contract Documents for additional construction details. All Related Work must be coordinated by the Contractor.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Contractor shall be an established firm of at least three (3) years in existence and have installed elevators of similar size and application to this project.

1.5 STANDARDS

- A. Except as modified by governing codes and by this Division, the work shall comply with provisions of the latest editions of the following, and in the event of conflict between these standards, the Commissioner’s determination shall be final:
 - 1. ASME A17.1: The American Society of Mechanical Engineers - Safety Code for Elevators and Escalators including Supplements as adopted by the New York City Department of Buildings, Elevator Division.
 - 2. ANSI A117.1: American National Standards for Buildings and Facilities Providing Accessibility and Usability for Physically Handicapped People.
 - 3. ADA: Americans with Disabilities Act.
 - 4. Building Code of the City of New York.

1.6 SUBMITTALS:

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. The Shop Drawings shall show material type and gauge, general dimensions, methods of attachment, location and size of reinforcements and openings, and a general arrangement of components. Approval thereof shall not relieve the Contractor of compliance with the specification, unless the attention of the Commissioner is called to the non-complying features in writing. Shop drawings shall be reflective of all Contract Documents.
- C. The Drawings submitted shall be as follows:
 - 1. Elevator section showing overhead, pit and floor to floor dimensions. The drawing shall be scaled and shall show all structure and beam locations and details. Details shall include the height of the cab, door operator and crosshead, including details of rope shackle.



2. Hoistway plan shall clearly show all typical dimensions to scale. In addition, plan shall identify all structural beam and divider beam locations and sizes; widths and depth of beams as they relate to the clear hoistway and hoistway walls; column pads in the pit and all column intrusions into the shaft. Provide large scale drawings and details of sill support condition and column encroachments.
3. Provide machine room plan showing all typical dimensions and equipment layout. Show clearly all electrical disconnects or switchgear in the code compliant location and to scale.
4. Provide large scale drawings for the car enclosure showing cab plan, reflective ceiling, wall elevations, front returns and car station integration. Detail section through wall panel from canopy to platform. Detail section through suspended ceiling including attachment to canopy. Detail typical joints, reveals and panel edging, panel attachments, handrail fastening and pad button attachment to shell. Include all gauges of steel components. Provide thickness and type of materials used for wall panels and ceiling along with lamination details.
5. Entrance details with the same specifics and quality of information provided for the cab details.
6. Provide fixture drawings job specific in large scale. Identify all engraving including font, depth of engravings and infill color material. (No applied or recessed plates shall be acceptable except for Braille plates.) Provide gauges of all material used. Provide faceplate fastener and hinging method and type.
7. Provide cut section through emergency light, position indicator, intercom/auto-dial telephone, buttons, Braille plates and service cabinet. (If requested)
8. Car frame and car platform construction details and layout complete. (If requested)
9. Machine isolation foundation fastening details and hydraulic oil line isolation fastening details (as applicable). Include manufacturer's data of all isolation equipment used.

D. Sample submissions shall include:

1. Cab or fixture material and finishes.
2. Braille plates and jamb designation.
3. Push-buttons, position indicators, emergency lighting fixture.

E. Sixty (60) days prior to the substantial completion of the work of the contract, the Contractor shall submit to the Commissioner six (6) copies of an Operation Maintenance and Parts Manual and six (6) complete sets of as-built. These shall be reviewed, and if approved, shall become the property of the City of New York.

1.7 PERMITS

- A. The Contractor shall file all necessary plans and application with the Building Department of the City of New York and obtain the required permits and approvals.
- B. The Contractor shall submit to the Commissioner a copy of the permit application, elevator specs, permit and print of elevator drawings as submitted and approved by the Building Department of the City of New York.



- C. Upon completion of the work, and prior to final payments, tests may be made by the Commissioner of all materials and appliances installed hereunder. The Contractor shall furnish all labor and materials required for such tests.
 - 1. Should the tests show that any of the materials, appliances or workmanship are not first class or not in compliance with the Specifications, the Contractor, on written notice from the Commissioner, shall remove same and promptly replace them with other materials and appliances in conformity with the Specifications.
- D. The Contractor shall perform all tests required by the Building Department of the City of New York in the presence of an authorized inspector to obtain Final Certificate of Inspection prior to turnover of the elevator to the City of New York.

1.8 PROTECTION

- A. Protect all items against dirt and damage. The Contractor shall be held fully responsible for all damage until final acceptance. Any equipment or property of the Commissioner damaged by this Contractor or the Contractor's employees, shall be restored to its original condition or replaced without cost to the Commissioner.

1.9 GUARANTEE

- A. Guarantee the materials and workmanship of the apparatus furnished under these specifications and shall make good any defects which may develop within 12 months from the date of substantial completion.

1.10 GUARANTEE SERVICE

- A. Furnish guarantee service on the equipment described herein for a period of one (1) year from the date of substantial completion. The service shall include systematic monthly examinations, adjustments and lubrication of all equipment. Also restore or replace any parts of equipment whenever this is required during the service period and shall use only genuine standard parts produced by the manufacturer of the equipment installed.
- B. All work under the service provisions shall be performed by competent personnel under the supervision and in the direct employ of the Contractor and 24-hour emergency call back service shall be available at all times and be included in the cost of the contract. Maximum response time for an entrapment shall not exceed 30 minutes and shall not exceed 2 hours for non-emergency shutdowns.
- C. Guarantee service requirements:
 - 1. Regularly and systematically examine, adjust, lubricate, clean and when conditions warrant restore or replace the following items and all other mechanical or electrical equipment.
 - 2. Hydraulic power unit and accessories: pump, motor, valves, operating valves, pulleys, drive belts, flexible hydraulic hose and fitting assemblies, oil tank, muffler, strainer, sound isolating coupling, plunger, packing gland, scavenger system, piping and other components.



3. Controller, Selector and Dispatching Equipment: all components including all relays, solid state components, resistors, condensers, transformers, contacts, leads, dashpots, computer devices, selector switches, mechanical or electrical driving equipment, coils, magnet frames, contact switch assemblies, springs, solenoids, resistance grids, hoistway vanes, magnets and inductors.
4. Hoistway door interlocks or locks and contacts, hoistway door hangers and tracks, bottom door gibs, cams, rollers, and auxiliary door closing devices for power operated doors. Chains, tracks, cams, interlocks, sheaves for vertical bi-folding doors.
5. Hoistway limit switches, slowdown switches, leveling switches and associated cams, vanes, and electronic components.
6. Guide shoes including rollers or replaceable gibs.
7. Automatic power operated door operators, door protective devices, car door hangers, tracks and car door contacts for both side slide and vertical bi-folding doors.
8. Traveling cables.
9. Elevator control wiring in hoistway and machine room.
10. Car safety mechanism and load weighing equipment.
11. Buffers.
12. Fixture contacts, push-buttons, key switches, locks, lamps and sockets of button stations (car and corridor), corridor lanterns, position indicators (car and corridor), direction indicators.
13. The guide rails shall be kept free of rust. Where roller guides are used, rails shall be kept dry and properly lubricated when sliding guides are used. Renew guide shoe rollers and gibs as required to ensure smooth and satisfactory operation.
14. Examine, and make necessary adjustments or restorations to the following accessory equipment including relamping of signal equipment: corridor lanterns, car and corridor position indicators, car stations, traffic director station, electric door operators, interlocks, door hangers, safety edge, and intercom systems.
15. Examine regularly and systematically all safety devices, and conduct an annual no load test, and each third year perform a full load, full speed test of safety mechanism and car buffers. The car balance shall be checked. All tests shall be performed in accordance with the provisions of the American National Standard, Safety Code for Elevators and Escalators (ANSI/ASME A1 7.A), current edition. Restore or replace conductor cables and hoistway and machine room elevator wiring.
16. Maintain all elevator equipment in hoistways, machine rooms, and pits in a clean, orderly condition, free of dirt, dust and debris.
17. Furnish lubricants compounded specifically for elevator usage.
18. Emergency calls and minor restorations shall be answered at all hours of the day or night. Minor restorations shall mean service which can be remedied by replacing a spare component stored on-site as further specified. Major restorations and normal preventative service work shall be performed during normal business hours.
19. The Contractor shall check the group dispatching systems (if applicable) and make necessary tests to ensure that all circuits and time settings are properly adjusted, and that the system performs as designed and installed.
20. Contractor shall perform the required mandated inspections and tests as required the Building Code of the City of New York during the term of the included one (1) year guarantee service.



- D. The Contractor shall keep the elevator maintained to operate at the original contract speed, keeping the original performance time, including acceleration and retardation as designed and installed by the manufacturer. The door operation shall be adjusted as required to maintain the original door opening and door closing times, within legal limits.
- E. The City of New York reserves the right to make inspections and tests as and when deemed advisable. If it is found that the elevator and associated equipment are deficient either electrically or mechanically, the Contractor will be notified of these deficiencies in writing, and it shall be the Contractor’s responsibility to make the necessary corrections within 30 days after the receipt of such notice.
- F. Approximately six months prior to the end of the guarantee period, the City of New York may make a thorough maintenance inspection of the elevator. At the conclusion of this inspection, the City of New York may give the Contractor written notice of any deficiencies found. The Contractor shall be responsible for correction of these deficiencies within 30 days after receipt of such notice.

1.11 KEYS

- A. At the completion of all work, the Contractor shall furnish ten (10) sets of keys for each key device installed.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF ELEVATOR SYSTEM

A. ELEVATOR "PE-1"

1. Quantity	One (1) Twin Jack Holeless Hydraulic Passenger Elevator
2. Capacity	6,000 Pounds Class “A” Freight Loading
3. Speed	80 FPM
4. Travel	17’ – 0”
5. Number of Landings	Two (2) @ 1, 2
6. Number of Openings	Two (2)
7. Operation	Simplex Selective Collective
8. Control	Microprocessor



- | | |
|-----------------------------|---|
| 9. Platform Size | 7' - 0" Wide x 9' - 0" Deep |
| 10. Buffers | Spring |
| 11. Car Enclosures | Refer to Section 2.33 |
| 12. Landing Doors | 5' - 0" Wide x 7' - 6" High |
| 13. Door Operation | Two-Speed Center Opening |
| 14. Machine Location | Adjacent @ 1 |
| 15. Communication Equipment | Auto-Dial Telephone
(Car and Machine Room) |
| 16. Power Supply | 3 Phase Building Voltage (40 Hp)
Disconnect to Include Contact |

2.2 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of the following:
1. Canton Elevator, Inc.
 2. Minnesota Elevator Company
 3. Otis Elevator Company
 4. Schindler Elevator Company
 5. Thyssen Elevator Company
 6. Or approved equal
- B. Additional equipment manufacturers. Subject to compliance with requirements, provide products from one of the following:
1. Controller - MCE, G.A.L., ESI, or approved equal
 2. Fixtures - EPCO, G.A.L., Monitor, National, or approved equal
 3. Door Protective Device – G.A.L., Janus, Tri-Tronics, or approved equal
 4. Cabs and Entrances – CEC, EDI/ECI, National Cab & Door, or approved equal

2.3 POWER UNIT

- A. The power unit shall be compactly and neatly designed with all components combined in a self-contained unit and with all adjustment features accessible. It shall include (at a minimum) a constant displacement rotary screw-type, pump motor designed for oil hydraulic elevator service, oil reservoir (minimum 10-gallon reserve) with an oil-level indicator, control valve, tank strainer in the suction line, integral pressure gauge and blowout proof muffler to reduce pulsations that may occur in the system. The power unit shall be tested and adjusted at the factory by operating a test elevator loaded to conform to the elevator specified herein.
- B. The motor shall be designed for 80 starts per hour.



2.4 POWER UNIT ISOLATION

- A. The power unit shall be mounted on vibration sound dampeners designed to isolate the unit from the building structure. Sound and vibration isolation pads shall be installed between the motor/pump assembly and the power unit structure and between the power unit and the machine room floor.
 - 1. Provide neoprene vibration isolator pads.
 - 2. All wiring connections to the power unit shall be flexible conduit, minimum 36" long, and installed slack.

2.5 VALVES

- A. A control valve including safety check valve, up direction valve with high pressure relief including up leveling and soft stop features, lowering valve including down leveling and manual leveling feature shall be mounted in a compact unit assembly. Control valves shall be solenoid operated and designed to open and close gradually to give smooth control. All valves shall be readily accessible for adjustment. The valve shall be equipped with a "no pressure sensing device" which will disable the piston from dropping if the car is blocked for any reason.

2.6 AUTOMATIC TWO-WAY LEVELING

- A. An automatic two-way leveling device shall be provided so that the car will approach landing stops at reduced speed from either direction of travel. The leveling device shall, within its zone, be entirely independent of the operating device and shall automatically stop and maintain the car within 1/4" level with the landing, regardless of change in load.

2.7 JACK UNIT

- A. Design and construct the jack unit in accordance with the applicable requirements of the ASME Code. It shall be of sufficient size to lift the gross load at the rated speed to the height specified and shall be factory tested to ensure adequate strength and freedom from leakage. No brittle material, such as gray cast iron, shall be used in the jack construction.
- B. The jack unit shall consist of the following parts: a plunger of heavy seamless steel tubing accurately turned and polished; a stop ring electrically welded to the plunger to positively prevent the plunger leaving its cylinder; an internal babbitt-lined guide bearing, packing or seal of suitable design and quality, a drip ring around cylinder top and a cylinder made of steel pipe and provided with a pipe connection and air bleeder.
- C. Install jack unit plumb with heavy duty clamps to attached guide rail brackets and/or building structure and intervals not to exceed 7' - 0" or as recommended by the equipment supplier.

2.8 PACKING GLAND AND OIL RETRIEVAL SYSTEM

- A. A steel packing gland with phenolic guide bearing, wiper ring and packing especially designed for hydraulic elevator service shall be provided. An oil retrieval system shall be furnished to return oil leakage back to the storage tank.



2.9 PIPING

- A. All hydraulic piping outside the power unit shall be seamless Schedule 80 Pipe with threaded connections.

2.10 HYDRAULIC MUFFLER AND ISOLATION COUPLINGS

- A. A muffler shall be provided in the oil line near the power unit. The muffler shall be designed to reduce pulsation and noise which may be present in the flow of the hydraulic fluid.
 - 1. Provide sound isolation couplings in the oil line. The couplings shall incorporate neoprene seals and gaskets to limit the transmission of vibrations.
 - 2. When the hydraulic pipe penetrates a wall or slab, the gap shall be filled with properly sized isolation and sealed accordingly.

2.11 CONTROLLER AND OPERATION

- A. A generic non-proprietary microprocessor-based controller shall be provided including necessary starting switches together with all relays, switches, solid state components and hardware required for operation, including door operation, as described herein. Operational control shall be by microprocessor. A three-phase overload device shall be provided to protect the motor against overloading.
- B. The elevator shall not require the functioning or presence of the microprocessor to operate on car top inspection or hoistway access operation to provide a reliable means of moving the car if the microprocessor fails.
- C. A motor limit timer function shall be provided which, in case of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing and park, open the doors automatically and then close them. Car calls shall be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on access or inspection operation. Door reopening devices shall remain operative.
- D. A valve limit timer shall be provided which shall automatically cut off current to the down valve solenoids if they have been energized longer than a predetermined time. The car calls shall then be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on access or inspection operation. Door reopening devices shall remain operative.
- E. A selector switch shall be provided on the controller to select high or low speed during access or inspection operation as long as contract speed does not exceed 150 feet per minute.
- F. Viscosity control shall cause the car to accomplish the following operation. A temperature sensor shall be provided to determine if the oil is too cold, and if there are no calls registered, the car shall go to the bottom landing and, as long as the doors are closed, the pump motor shall run without the valve coils energized to circulate and heat the oil to the desired temperature. In the event that the temperature sensor fails, a timer shall prevent continuous running of the pump motor.



- G. The control system shall provide comprehensive means of accessing the computer memory for elevator diagnostic purposes. It shall have permanent indicators for important elevator statuses as an integral part of the controller.
- H. Failure of any single magnetically operated switch, contactor, or relay to release in the intended manner; the failure of any static control device, speed measuring circuit, or speed pattern generating circuit to operate as intended; the occurrence of a single accidental ground or short circuit; shall not permit the car to start or run if any hoistway door or gate interlock is unlocked or if any hoistway door or car door or gate contact is not in the made position. Furthermore, while on car top inspection or hoistway access operation, failure of any single magnetically operated switch, contactor or relay to release in the intended manner; the failure of any static control device to operate as intended; or the occurrence of a single accidental ground, shall not permit the car to move even with the hoistway door locks and car door contacts in the closed or made position.
- I. Dedicated permanent status indicators shall be provided on the controller to indicate when the safety string is open, when the door locks are open, when the elevator is operating at high speed, when the elevator is on independent service, when the elevator is on fire service, when the elevator out of service timer has elapsed, and when the elevator has failed to successfully complete its intended movement. In addition, a means shall be provided to display other special or error conditions that are detected by the microprocessor.
- J. An out of service timer shall be provided to take the car out of service if the car is delayed in leaving the landing while there are calls existing in the system.
- K. Door Protection Timers:
 - 1. Door protection timers shall be provided for both the opening and closing directions, which will protect the door motor and will help prevent the car from getting stuck at a landing. The door open protection timer shall cease attempting to open the door after a predetermined time in the event that the doors are prevented from reaching the open position. In the event that the door closing attempt fails to make up the door locks after a predetermined time, the door close protection timer shall reopen the doors for a short time. If, after a predetermined number of attempts, the doors cannot successfully be closed, the doors shall be opened and the car removed from service.
 - 2. A minimum of four different door standing open times shall be provided. A car call time value shall predominate when only a car call is canceled. A hall call time value shall predominate whenever a hall call is canceled. In the event of a door reopen caused by the safety edge, photo eye, etc., a separate short door time value shall predominate. A separate door standing open time shall be available for lobby return.
 - 3. If the doors are prevented from closing for longer than a predetermined time, door nudging operation shall cause the doors to move at slow speed in the closed direction. A buzzer shall sound during the nudging operation.
- L. Car and hall call registration and lamp acknowledgment shall be by means of a single wire per call, in addition to the ground and the power bus. Systems that register the call with one wire and light the call acknowledgment lamp with a separate wire, are not acceptable.



- M. Fire Phase I emergency recall operation and Phase II emergency in-car operation shall be provided according to applicable Building Code of the City of New York.
- N. Independent service operation shall be provided in such a way that actuation of a key switch in the car operating panel will cancel any existing car calls, and hold the doors open at the landing. The car will then respond only to car calls. Car and hoistway doors will only close with constant pressure on a car call push-button or the door close button. While on independent service, hall arrival lanterns or jamb mounted arrival lanterns shall be inoperative.
- O. Simplex Selective Collective automatic operation shall be provided for the installations. Operation of one or more car or hall call push-buttons shall cause the car to start and run automatically, provided the hoistway door interlocks and car door contacts are closed. The car shall stop at the first car or hall call set for the direction of travel. Stops shall be made in the order in which car or hall calls set for the direction of travel are reached, regardless of the order in which they were registered. If only hall calls set for the opposite direction of travel of the elevator exist ahead of the car, the car shall proceed to the most distant hall call, reverse directions, and start collecting the calls.
- P. A relay panel inspection switch and an up/down switch shall be provided in the controller to place the elevator on inspection operation and give the ability for the user to move the car in the hoistway. The car top inspection switch shall render the relay panel inspection switch inoperative.
- Q. A timer shall be provided to limit the amount of time a car is held at a floor due to a defective hall call or car call, including stuck push-buttons. Call demand at another floor shall cause the car, after a predetermined time, to ignore the defective call and continue to provide service in the building.
- R. The microprocessor boards shall be equipped with on-board diagnostics for ease of troubleshooting and field programmability of specific control variables. The field changes shall be stored permanently, using non-volatile memory. The microprocessor board shall provide the features below.
 - 1. On-board diagnostic switches and an alphanumeric display. These switches and displays shall provide user-friendly interaction between the mechanic and the controller.
 - 2. On-board real time clock. The real time clock shall display the time and date and is adjustable by means of on-board switches.
 - 3. Field programmability of specific timer values (i.e., door times)
- S. As an integral part of the controller, the capability shall be provided to attach on-site or remote computer peripherals, yielding additional adjustment or diagnostic capabilities.
- T. Hoistway Access Key Switch operation at the terminal landings are to gain access to the top of the car from the top landing and to gain access to the pit from the bottom landing.
- U. Provide a keyed floor lockout.



2.12 REDUCED CURRENT STARTING

- A. Reduced current starting shall be furnished which shall limit both the initial starting current and peak current drawn by the motor.
 - 1. Provide solid state reduced voltage starting systems.

2.13 LOW OIL CONTROL

- A. In the event of a low oil condition, a low oil control feature shall be provided designed to automatically cause an up traveling car to descend to the lowest terminal landing to permit passengers to egress. The doors shall then automatically close and all control buttons, except the "Door Open" button in the car operating panel, shall be made ineffective. The oil reservoir should be refilled before the elevator is returned to service. The low oil control may be utilized as part of the Automatic Lowering Feature as specified herein.

2.14 AUTOMATIC POWER FAILURE SAFETY SYSTEM

- A. Provide a battery powered Auto-Lowering System.

2.15 MAIN GUIDE RAILS

- A. Provide machine standard (15 lb./ft.), "T" section guide rails with tongue and grooved joints for the car's main rails. Use not less than 3/4" thick steel machined fishplates to form rail joints. Connect rails to fishplates with four (4) bolts. Brackets shall be used to support the rails from the hoistway framing, pre-cast concrete planks and/or inserts. Rails to be attached to the brackets with clips. Provide rail backing where no intermediate support framing is shown on the drawing. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8" (plus or minus 1/16").
 - 1. Inserts (if used) shall be coordinated with other trades. Provide the Commissioner with clear insert location drawings (shaft plan and section).

2.16 CAR SLING

- A. The car frame shall be constructed of structural steel.
- B. Design the car frame for a 8' - 6" overall cab height, (8' - 0" clear cab).
- C. Design for Class "A" Freight loading.

2.17 PLATFORM

- A. The platform shall be steel construction mounted on manufacturer's standard vibration isolation pads. The sub-flooring is to be constructed of two (2) layers of 3/4" marine-grade plywood (finished flooring is by other trades). The underside of the platform shall be properly fireproofed with 26 gauge galvanized steel metal in a maximum of two (2) sections.



- B. Provide an extruded nickel-silver car sill.
- C. Recess the platform as required for the finish flooring.
- D. Design for Class "A" Freight loading.

2.18 CAR GUIDE SHOES

- A. The car frame shall 6" roller guide shoes attached at the upper and lower portion of the stiles. These roller-guide shoes shall be adjustable, spring loaded type with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car frame. Provide roller guide shoes.

2.19 BUFFERS

- A. Spring buffers shall be provided in the elevator pit. Means shall be provided for mounting buffers securely on channels at the pit floor.

2.20 HOISTWAY ENTRANCES

- A. Hoistway entrances of the hollow metal horizontal sliding, single speed type, shall be provided at each hoistway opening. Each entrance shall include 14 gauge steel unit frames (corners to be welded and ground smooth), flush design 16 gauge door panels, sight guards, extruded nickel-silver sills, strut angles, headers, hanger covers, fascia plates, toe guards, dust covers and necessary hardware.

- B. Material and Finish shall be as follows:

1. Frames: Stainless Steel Brushed Finish
2. Door Panels: Stainless Steel Brushed Finish
3. Sight Guards: Stainless Steel Brushed Finish

- C. Fascias, hanger covers, toe guards and dust covers shall be a minimum of 16 gauge and have the manufacturer's standard enamel or galvanized finish. Structural members shall have prime coat finish.

1. Header, Struts and strut extensions shall be a minimum of 10 gauge formed steel.

- D. Sills, struts, headers, hanger covers and unit frames shall be erected prior to the erection of rough walls and set in proper relation to the car guide rails. Door panels shall be installed after the walls are finished.

- E. Provide keyholes for each landing door in accordance with equipment requirements with stainless steel ferrule insert.

- F. Use sill mounted spring closers.

- G. Provide 5" x 5" x 3/8" sill support angles.



2.21 MASTER DOOR OPERATOR

- A. A Master Door Operator with a ½ Hp direct current motor shall be provided to open and close the car and hoistway doors simultaneously, at a maximum speed of not less than 1 ½ feet per second. Door movement shall be cushioned or checked at both limits of travel. An electro-mechanical interlock shall be provided on each hoistway door to prevent the operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car door to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power from any cause, the doors can be readily operated by hand from within the car. Emergency devices and keys for operating the doors from the landing shall be provided unless otherwise specified by the Building Code of the City of New York.
- C. The doors shall open automatically when the car is leveling at the respective landings and shall close after a predetermined time interval or immediately upon pressing a car button. A "Door Open" button shall be provided in the car, the momentary pressing of which shall reopen the doors and reset the time.

2.22 DOOR EDGE PROTECTIVE DEVICE

- A. Provide an infra-red curtain type reopening device with proximity detector that will stop and reopen the car door and hoistway door automatically if the door becomes obstructed by an object or person. The device shall be capable of completing these operations without required contact for an obstruction passing through the opening. The device shall be a non-reflective through beam system with a minimum of forty sensors per edge. It shall have a maximum sensor spacing of 1.8" or less. It shall incorporate a microprocessor controlled fail-safe system. It shall be capable of self-adjustment to compensate for varying environmental conditions. Provide approved proximity type device.

2.23 DOOR HANGERS AND TRACKS

- A. Hangers and tracks shall be provided at each car and hoistway entrance. Tracks shall be of bar steel with the working surface contoured to match the sheaves. The hangers shall be designed for power operation and have provisions for vertical and lateral adjustment. Hangers shall be designed for two point suspension of the door panel.
- B. Hanger sheaves shall be polyurethane with pre-lubricated and sealed-for-life bearings. Car door hangers shall have 3 ¼" diameter sheaves. Hoistway door hangers shall have 3 ¼" diameter sheaves.

2.24 INSPECTOR'S OPERATING STATION

- A. An inspector's operating station shall be provided on top of the elevator car consisting of "Up" and "Down" constant pressure buttons, incandescent light with guard, 110 Volt G.F.I. work outlet and an emergency stop switch.



1. Provide an additional light with guard and G.F.I. work outlet mounted to the bottom of the car and located towards the front for easy access.

2.25 PIT EMERGENCY STOP SWITCH

- A. An emergency stop switch shall be provided in the elevator pit, designed to cut off current supply to motor and "down" direction valves and bring the car to rest independent of the regular operating devices.

1. Locate the pit stop switch in accordance with the Building Code of the City of New York.

2.26 ALARM BELL

- A. An electric signal bell shall be provided in or adjacent to the elevator hoistway as directed. This bell shall be connected to the alarm button in the car operating panel.

2.27 CAR OPERATING PANEL

- A. A car operating panel shall be furnished in the car containing illuminating buttons for each landing, flush-mounted Braille tags, emergency car light with flush lens, door open and close buttons, autodial telephone station, emergency stop switch, F.E.R. Phase II key switch, indicator light and signage, alarm button and key switches for light, fan and independent service. All fixture components shall be back plate mounted and shall be incorporated into the swing front return panel of the cab.

1. The auto-dial telephone unit shall be mounted to the backplate and concealed behind the swing front return. Provide a perforated hold pattern in the swing front return panel for speakers and microphone voice transmission.
2. Provide an L.E.D. position indicator with a minimum 2" high characters.
3. The light, fan an independent service key switch along with a 110 Volt G.F.I. outlet, shall be located in a key-locked service cabinet below the body of the car station. The service cabinet door shall be flush with the swing front return with concealed hinges.
4. Provide car stations with all signage and components to comply with NYC Appendix K and all ADA requirements.

2.28 ILLUMINATED CALL AND CAR BUTTON

- A. Call registration lights shall be provided in each push-button unit. When a button is pressed, it shall illuminate, signaling to the waiting passenger that the call has been registered. Each button shall remain illuminated until the call has been answered.

1. Provide non-directional satin stainless steel buttons throughout. Acceptable manufacturers are EPCO, Innovation, Monitor or approved equal. Button finish shall match the finish of surrounding cab swing front return panel.



2.29 CAR LANTERNS

- A. Lanterns with one stroke up, two strokes down gongs shall be provided.
- B. As soon as the car has reached a predetermined distance from a landing and is set to stop at that landing, the corresponding lantern shall be illuminated and the gong shall sound whether the hall button has been pressed or not and the lantern shall remain illuminated until the car has left that landing. All visual and audible signal timing shall be in accordance with A.D.A. requirements.
- C. Provide backplate mounted fixtures with only the lens projections through the swing front return jamb.

2.30 HALL CALL STATIONS

- A. Provide unit with No. 4 stainless steel faceplates with (1/8" thick) beveled edges and tamper proof fasteners.
- B. Provide F.E.R. Phase I key switch at the main egress level and LED position and direction indicators at each floor.
- C. Include all fire fighter instructions and as required by Appendix K.
- D. Include L.E.D. position and direction indicator in each hall call station.

2.31 ELECTRIC WIRING

- A. Furnish and install complete, necessary, insulated wiring to connect all parts of the equipment. Wiring, conduit, fittings and installation shall be in accordance with Division 26, and comply with the requirements of the National Electric Code.
- B. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall run in concealed galvanized metal conduit, metallic tubing or wire ducts.
 - 1. Flexible metal conduit shall be permitted for short runs only.
- C. Traveling cables between car and hoistway shall have a flame retarding and moisture resisting outer cover. They shall be flexible and suitably suspended to relieve strains in the individual conductors. The traveling cable shall also include:
 - 1. A minimum of 10% spare conductors, (ends to be left accessible to facilitate connections at a later date).
 - 2. Wiring as required for the auto-dial telephone and firemen's communication as required by the Building Code of the City of New York.
 - 3. A video co-axial cable type RG 59U, (leave adequate slack in the machine room and top of car to facilitate final hookup).
 - 4. Six (6) pairs of 18 gauge shielded cables, (terminating on terminal strips in the controller and in the car operating station).



2.32 TERMINAL LIMIT SWITCHES

- A. Terminal limit switches shall be provided in the hoistway, designed to automatically stop the car at the terminal landings, within the designated top and bottom overtravels.
 - 1. The switches shall be rail mounted with rubber (or similar) rollers which are engaged by a car mounted cam. The beveled section of the cam shall be designed for smooth, quiet engagement of the switches.

2.33 CAR ENCLOSURE

- A. A description of the cab interior is as follows:
 - 1. Shell - 14 gauge steel walls shall be laminated in 1/8" thick aluminum diamond plate and 12 gauge steel for canopy. Individual panels shall be reinforced to provide for a flat, rigid surface. Apply spray on sound deadening on rear of shell. Sound deadening material shall be non-combustible and applied in accordance with manufacturer's recommendation. Provide a minimum 1/8" consistent thickness on all surfaces.
 - a. Provide welded re-enforcement grounds (minimum 1/4" thick with weld nut) on the rear of the shell for handrail mounting. Provide all cutouts in the shell as required for ventilation and fixture installation.
 - 2. Front Return Panels - Provide 14 gauge brushed stainless steel full front swing return panels. The swing return panels shall have a concealed continuous hinge and a substantial locking system. Provide no more than a 1/4" clearance between the swing return panel and the finish floor and a 1/16" between the swing return panel and transom.
 - a. The swing return panels and hinging system shall be suitably re-enforced to prevent appreciable or permanent sagging or deflection when opened for maintenance.
 - 4. Transom - 14 gauge brushed stainless steel in a pattern as selected by the Commissioner. Apply sound deadening to the back of the transom as specified above.
 - 5. Doors - 16 gauge brushed satin stainless steel with full height rubber astegral at the leading edge of each door panel. Provide the same construction as for the hoistway doors.
 - 6. Sills - Extruded nickel-silver.
 - 7. Ceiling - 1/8" thick aluminum diamond plate on 3/4" MDF backer board. All edges to be aluminum.
 - a. One ceiling panel shall be removable for top emergency egress. A substantial, positive locking mechanism shall be utilized to hold the removable panel in place, flush with the adjoining panels and flat throughout. Show all details on the shop drawings.
 - b. Provide rimless 3" dia. aperture light fixtures 3000k, 85 cri, base of design: Edison Price LED/4 narrow flood, fully diffuse clear.
 - 8. Handrails - Provide 1-1/2" diam. brushed stainless steel handrail along the back wall. Design the handrail to withstand a minimum 500 lb. vertical point load at the center between handrail supports.
 - a. Handrail mounting equipment shall be solid non-directional satin stainless steel and spaced no more than 24" apart.
 - 9. Exhaust Fan - Two-speed Nylube fan, mounted on vibration isolation pads.



10. Protection Pads - Provide one (1) set of protection pads per elevator (cost is included in the base bid). Provide heavy-duty vinyl impregnated nylon with 1/4" thick padding. Pads are to be fire retardant and treated to be self-extinguishing. Include a metal stiffening bar on top of pads and include retaining clips to hold the pads in place. Provide pads in a color as selected by the Commissioner.
11. Pad Buttons - Provide extended type stainless steel pad buttons bolted through the shell. Provide weld nuts on rear of shell to accept the pad buttons.
12. Base - 12 gauge brushed satin stainless steel.
13. Concealed Vent Slots - Design the cab interior to provide for ventilation openings in the base of the cab.
14. Flooring - 1/8" thick aluminum diamond plate.
15. Reveals, Frieze All exposed reveals, friezes, etc. shall be non-directional satin stainless and Other Exposed Areas shall be steel with a nondirectional satin finish.
16. Engraving - No applied plates will be accepted. No manufacturer's logos shall be visible.

2.34 PERFORMANCE

- A. Speed to be within 5% of rated speed in both directions of travel and under any load.
- B. Leveling to be within 1/4" of the Hoistway Sill level.
- C. Maximum 400 psi working pressure.

2.35 HANDICAPPED REQUIREMENTS AND COMMUNICATIONS

- A. Locate a door reopening device at 5" and 29" above the finish floor, the alarm button and emergency stop switch at 35" and the floor and control button not more than 54".
- B. Provide raised markings in the panel to the left of the floor and control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons. Plates, if used, shall be stud mounted and recessed flush with the car station.
- C. The centerline of the hall push-button station shall be 42" above the floor. The hall lanterns or cab lantern shall sound once for the "up" direction and twice for the "down" direction.
- D. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor. Designations shall be 2" high, raised .03" and shall be as selected by the Commissioner.
- E. Provide an audible signal to tell passenger that the car is stopping or passing a floor served by the elevator.
- F. Provide emergency communications and auto-dial telephone in the elevator cab and machine room. System shall provide for communications between the machine room and cab in accordance with the Building Code of the City of New York. At a minimum, the auto-dial telephone shall include the following features:



1. Fully A.D.A. compliance including "Call Acknowledged Indicator".
2. Powered by phone line only.
3. Two number capability.
4. Automatic location identification message.
5. Non-volatile memory.
6. Remote programming.
7. Adjustable line disconnect timer.
8. Call back capabilities.
9. Communication between machine room and cab to comply with Appendix K and all related requirements of the Building Code of the City of New York.

2.36 MATERIALS

- A. Sheet Steel for Exposed Work: Stretcher-leveled, cold rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish.
- B. Sheet Steel for Unexposed Work: Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A569.
- C. Structural Steel Shapes and Plates: ASTM A36 and AISI 1018.
- D. Stainless Steel: Type 300 Series complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability. Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering. All finishes specified as "satin" to be Manufacturer's standard directional polish that complies with commercial No. 4 requirements. All finishes specified as "mirror" to be Manufacturer's standard mirror polish that complies with commercial No. 8 requirements.
- E. Bronze: Cold finished muntz metal type UNS C28000-HO2 complying with ASTM B36/B36M. Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering. All finishes specified as "satin" to be Manufacturer's standard directional polish that complies with commercial No. 4 requirements. All finishes specified as "mirror" to be Manufacturer's standard mirror polish that complies with commercial No. 8 requirements.
- F. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- G. Plastic Laminate: ASTM E84 Class A and NEMA LD3, 0.050" (1.3 mm) up to 1/16" (1.6 mm) nominal thickness. Exposed surfaces to have color selected by Commissioner from Manufacturer's standard selection.
- H. Fire Retardant Treated Particle Board Panels: Minimum 3/4" (13mm) thick backup for plastic laminate veneered panels provided with suitable anti-warp backing; to meet ASTM E84 Class "A" rating with flame-spread rating of 25 or less.



- I. Paint: Unexposed Steel and/or Iron: Clean metal of oil, grease, scale and other foreign matter and paint one shop coat of Manufacturer's standard rust-resistant primer. Primer shall be of a low V.O.C. water-based type. Galvanized metal need not be painted.
- J. Exposed Steel: Clean exposed metal of oil, grease, scale and other foreign matter. Eliminate any dents, scratches, or other defects that would affect the final finish. For material delivered with primer coat only, apply two coats of manufacturer's standard baked enamel primer. For material delivered with a finished coat, apply an additional two coats of manufacturer's standard baked enamel of a color selected by the Commissioner from the manufacturer's standard color selection.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 Design Requirements:

- A. Electrical Design and Wiring:
 1. All wiring shall be Underwriters approved stranded type in accordance with the latest International Electrical Code. Minimum size permitted shall be No. 18 AWG. These wires shall be installed in conduit with steel outlet boxes. All electrical boxes (Hall pushbutton boxes, Car Stations, Terminal boxes, pull boxes, etc.) and other similar items shall be of approved construction, hot-dip galvanized or electroplated with Zinc Dichromate. All electrical boxes exceeding 150 cubic inches shall be supported independently of the conduits.
 2. All raceway shall be galvanized EMT and/or trough.
 3. Furnish all materials and completely wire all parts of the electrical equipment of the elevator, including electrical devices on hatch doors.
 4. Switches, relays, etc. on controller, starter, and signal panels and similar items on other parts of the equipment, shall be the latest model. Any parts showing wear or damage during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced by the Contractor.
 5. Contacts in elevator motor circuits, which are intended to be opened by the governors or other safety devices, shall be copper to carbon, or other approved non-fusing type. Relays shall be designed for visual inspection and easy replacement of contacts with minimal disassembly, and keyed parts for ease in reassembly. They shall be equipped with suitable blowout coils, vanes, barriers, etc., to prevent undue arcing and heating. Current ratings for silver-to-silver contacts on relays used in motor circuit applications shall be at least three times the current draw of the running ratings of the motor. Contacts on control and signal relays and switches shall generally be of silver alloy.
 6. Conduits shall be run and connected to suitable approved connection boxes at all outlets, apparatus and panels.



7. The conduits shall be of such size that the wires or cables can be readily installed and replaced, if necessary. No conduit or raceway shall be less than 3/4 inch trade size, except that for small devices such as door switches, interlocks, etc. for which, 1/2 inch conduit may be used. The total overall cross-sectional area of the wires contained in any conduit shall not exceed 40 percent of the internal area of the conduit. Approved strain boxes shall be installed for all vertical runs in accordance with the Building Code of the City of New York.
8. Conduits shall be neatly and systematically run. All exposed conduit and boxes shall be supported by straps (wire or plastic ties are not acceptable), hangers, or clamps to the structural steel, reinforced concrete, or other approved supports. Riser conduits and/or trough in hoistway shall be supported at each floor level.
9. Connections of all wires larger than No. 8 AWG shall be made with copper connectors except for Mainline Disconnect switches where UL approved aluminum lugs/connectors may be used. Metal eyelets pressed around the strands shall be used for all connections of smaller stranded conductors.
10. All terminals shall be tagged or identified in a permanent legible manner to match car and hoistway junction boxes and controllers.
11. In all machine rooms, hoistways, etc., install the equipment to provide for easy access for maintenance.
12. All screws used for terminal connections of all wiring (machine room, hoistway and pit) shall be of proper size and type as approved.
13. All connections of wires to controller and motor lead terminals from external circuits shall be made with "copper" soldered lugs or "copper" eyelet compression type lugs.
14. All elevator lights (top and bottom of car and pit) and A.C. alarm bells shall be fused and located in the elevator machine room in a separate approved box, or on the controller. The fuses shall be identified (permanent label) "lights and alarm bells".
15. All receptacles in elevator machine room, pits, and car shall be Ground-Fault Circuit Interrupter type (GFCI).
16. All grounding shall be done in accordance with the latest International Electrical Code as adopted by the Building Code of the City of New York. Grounding of machine to bedplate is not permitted.

B. Mechanical Design Requirements:

1. All bearings, pivots, guides, guide shoes, gearing, door hanger sheaves, door hanger tracks, and elements subject to friction or rolling wear shall be accurately finished and arranged for convenient lubrication. Provide means for flushing and draining the larger bearings and gear cases. All oiling holes shall have dustproof, self-closing caps.
2. All bearings shall be sized for heavy-duty commercial elevator usage.
3. Ball and roller bearings shall be fully enclosed. Loading, lubrication, support and all other conditions of use shall be in accordance with the recommendations of the bearing manufacturer. Bearings for motors shall be of the open (non-sealed) type with approved fittings for grease lubrication or approved sealed bearings. The bearings shall not be part of the end bell housing, but shall be separate for easy removal and replacement.



4. All bolts used to connect moving parts, bolts carrying hoisting stresses, and all other bolts except guide rail bolts, subject to vibration or shock, shall be designed to prevent loosening of the nuts and bolts. Bolts transmitting shearing stresses between machine parts shall have tight body fit in drilled and reamed holes. All bolts subject to vibration shall be provided with split ring lock washers. All guide rail vane brackets shall be through bolted and provided with proper bolts, nuts and lock washers.
5. All parts shall be manufactured to high precision standards so that wearing parts will be readily interchangeable with stock service parts with a minimum of field fittings.
6. All bearing and sliding surfaces of shafts, pins, bearings, bushings, guides, etc., shall be smoothly and accurately finished. During the guarantee service period, all bearings shall be regularly checked for any tendency to run hot and any defects corrected.
7. Protection for moving parts: Belts, pulleys, chains, gears, couplings, projecting set screws, keys, and other rotating parts located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded.
8. All exposed hardware on public hall side shall be of tamperproof design constructed of stainless steel with No. 4 satin finish.
9. Tamperproof stainless steel spanner head screws shall be used for all exposed locations, for all landing button panels, certificate frames, interlocks and car lighting fixtures. Supply one Spanner head wrench for each size screw. Tamperproof screws shall be of the "captive type". Self-tapping screws or self-tapping machine screws shall not be permitted.
10. All locks and key operated switches shall be five (5) pin tumbler type. All keys where permitted shall be of the captive type. Furnish two (2) keys for each lock and/or switch for each elevator. All locks shall be mastered to one master key. Furnish four (4) master keys. Firemen's Service keys shall meet requirements of the Building Code of the City of New York.

3.3 WORKMANSHIP AND INSTALLATION

A. Inspection and Tests:

1. Keep the shutdown time within the specified limit. Any delays in the approved schedule shall be brought immediately to the attention of the Commissioner, in writing, along with the proposed revised schedule.
2. Arrange and schedule final inspection of all work and notify the Commissioner in writing that the work has been thoroughly checked and is ready for final inspection. Testing shall be performed under the direction of authorized Inspectors.
3. When the elevator work is completed, conduct operating tests to the satisfaction of the Commissioner. The inspection procedure outlined in the ASME A17.2 for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual will form a part of the final inspection.
4. Furnish all test instruments, labor and materials, required at the time of final inspection. They shall include, but not necessarily be limited to, standard 500 pound test weights.
5. Certificates: Before final acceptance, furnish all certificates required by the Building Department of the City of New York. All certificates shall be turned over to the City of New York with copies to the Commissioner.



6. If requested by the Commissioner, the following tests shall be made by the Contractor, with the Commissioner present, at the time of final inspection:
 - a. FULL LOAD-RUN TEST: Shall be for one hour continuous run, with full specified rated load in the car. During the test run, the car shall be stopped at all floors in both directions of travel for a standing period of ten (10) seconds per floor.
 - b. SPEED TEST: The actual speed of the elevator car shall be determined in both directions of travel and with full contract load and no load in the elevator car. Speed tests shall be made before and also after the full load run test. Speed shall be determined by applying a tachometer to the car hoisting cables. The actual measured speed of elevator car with full load in "UP" direction shall be within 5 percent of specified rated speed.
 - c. TEMPERATURE RISE TEST: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometer on top of windings and shielded by cotton waste or putty. Temperature rise of the equipment shall not exceed the temperature rise for the class of insulation used in the motor tests, shall be started only when all parts of the equipment are within 5° centigrade of the ambient temperature at time of starting test.
 - d. CAR STOPPING ACCURACY: Elevator stopping shall be tested for accuracy of landing within 1/2 inch plus or minus (from finished floor) at all floors with no load in car, balanced load in car and full load, in both directions of travel. Accuracy of floor landing shall be determined both before and after the full load run test.
 - e. INSULATION RESISTANCE TEST: The complete wiring systems of elevator shall be free from short circuits and grounds, and the insulation resistance of systems determined by use of a "Megger", shall be not less than one megohm. (Solid State Controllers are excluded from this test).
 - f. CAR SAFETY AND GOVERNOR TESTS: The car safety and governor shall be tested as outlined in Section 1003 ASME A17.1 Code.
 - g. STATIC CAR BALANCING: The car shall be statically balanced in its sling so that the total lateral force on top car guide assemblies shall be a maximum of forty pounds (40 lbs.) for all positions of the car in the shaftway.
 - h. DYNAMIC SYSTEM BALANCING: Car and counterweight suspension system shall be dynamically balanced so that total weight of counterweight and its frame shall be equal to total weight of unloaded car and its sling, plus forty percent (40%) of contract load with an accuracy of plus or minus fifty pounds (50 lbs).
 - i. ELECTRICAL PROTECTIVE DEVICES: All electrical protective devices in the wiring system (Fuses, Overloads, etc.) shall be tested for proper operation.
 - j. The FIREMAN'S SERVICE SYSTEM shall be tested for proper operation.
 - k. PASSENGER OVERLOAD TEST: The car shall be tested with 125% of rated load and shall conform to all passenger overload regulations in ASME A17.1. In addition, the car shall be subjected to the Acceptance and 5 Year Tests for Drive Machine Brakes in ASME A17.2.1, Inspectors' Manual for Electric Elevators.
 - l. BUFFER TEST: Car and Counterweight Oil Buffers shall be tested in accordance with the requirements for Acceptance and 5 Year Tests for Oil Buffers, as described in ASME A17.2.1, Inspectors' Manual for Electric Elevators.
 - m. TEST SECURITY INTEGRATION



B. Cleaning, Adjustment, and Final Acceptance:

1. At the end of each day, remove and legally dispose of all refuse and dirt resulting from work of this contract. All work areas shall be left "broom clean". After completion of work, thoroughly clean and adjust elevators so that they are in proper operating condition. Remove from site, all materials which are not required as part of finished work.

C. Safety of Persons and Property:

1. Plan the work and execute in an organized and orderly manner. Danger and warning signs shall be prominently displayed, and exercise every precaution to protect pedestrians.
2. Erect construction barriers around the work area. Keep dust and noise at a minimum. Barricades shall not have protruding nails or sharp jagged edges.

D. Protection:

1. Protect all items against dirt and damage. The Contractor shall be held fully responsible for all damage until final acceptance. Any equipment or property of the City of New York damaged by this Contractor or the Contractor's employees shall be restored to its original condition or replaced without cost to the City of New York.

E. Contractor's Shop:

1. Contractor must maintain or have access to an adequate shop within proximity of the project, carry in stock, all spare parts furnished under this Section which are subject to periodic failure.

F. Storage:

1. The Commissioner will designate a suitable area where the Contractor may store equipment until the work is completed. All equipment shall be stored at the sole risk of the Contractor.
2. The Contractor shall provide his own lock and key. The assigned storage area shall be left clear and unencumbered of material or debris and shall be left in a broom-clean condition at the completion of the work. An approved Type "C" fire extinguisher shall be provided and installed on a wall, for each storage area assigned to the Contractor.

G. Access to Elevator Equipment:

1. The Contractor shall provide keys for access to all the elevator equipment.

H. Punch List Items:

1. All punch list items shall be completed within thirty (30) consecutive calendar days of receipt of Punch List items.



3.4 SHAFT CLEANING

- A. The entire shaft, from the pit floor to the underside of the machine room slab, shall be thoroughly cleaned of all debris, lint, grease, dust, etc.

3.5 HOISTWAY PROJECTIONS

- A. Provide seventy-five (75°) degree concrete bevels on all ledge projections in excess of two inches of all elevator hoistways on all floors.

3.6 PAINTING

- A. Summary of Work Included:

1. Clean all ironwork and paint with one shop coat of primer coating. Do not paint galvanized steel with enamel coating. After erection, touch up bare spots on iron work. Apply final field coat of paint similar to shop coat.
2. Touch up any wall and ceiling surfaces damaged by work of this project with at least two coats of paint to match finish.
3. Paint metal with one coat of an oil based rust inhibitive primer and one coat of an enamel alkyd paint.

- B. Samples:

1. Before placing orders for materials, submit the name or names of manufacturers for approval.
2. Upon approval of the manufacturer, submit samples of all materials. Approval of the samples will be based upon manufacturers certifying that the products proposed are the standard best or top brands produced by them and are readily obtainable as such in "over the counter" sales. Do not proceed until all samples are approved.
3. All materials shall be further subject to field tests from time to time as the work progresses.

- C. General Painting Requirements

1. Delivery: Deliver all material in their original containers with seals unbroken. Order in advance, in large enough quantities and in ample time to facilitate the work.
2. Storage of Materials: Store materials where directed. Keep storage space clean and accessible at all times. Remove paint or oil-soaked rags, waste, etc. from the premises at the close of each day's work. Absolutely no flammable or combustible materials are to be stored on the City of New York's property.
3. Protection: Provide suitable coverings to protect all work and all adjacent surfaces and objects.
4. Cleaning Up: Upon completion of the work, remove all surplus materials, empty containers, rags, and other debris from the premises. Touch up finished work where directed. Remove daubs or spatters of paint from all surfaces.



D. Workmanship:

1. Carefully prepare all surfaces to be painted. Do not apply paint until the surfaces are absolutely dry and clean.
2. Shop or priming coats shall be put in good condition; touch up any bare or abraded spots.
3. Wire brush all metal surfaces. Remove all abrasions in the prime coat, rust, scale, etc. Clean and touch up damaged areas to match prime coat. Clean metal work with solvent to remove all dirt and grease.
4. Clean concrete and masonry surfaces to be painted of all grit, dirt and loose material. Patch scratches, cracks, holes and similar defects in wall and ceiling surfaces to provide a smooth flush surface. Patched portions shall be given a coat of primer sealer in addition to all other specified coats.
5. Each coat of paint shall dry before subsequent coat is applied. The finished work shall be free from runs or sags, defective brushing or brush marks, and clogging of lines and angles. Exposed surfaces shall be left clean.

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SECTION 210500

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
 2. Mechanical sleeve seals.
 3. Sleeves.
 4. Escutcheons.
 5. Grout.
 6. Fire-suppression demolition.
 7. Concrete bases.
 8. Supports and anchorages.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “ Submittals Procedures”.

1.4 SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements.”
- B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment must comply with requirements.

1.6 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to Division 21 Section 211000 "Water-Based Fire Suppression System" for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 21 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12.
- G. Solvent Cements for Joining CPVC Plastic Piping: ASTM F 493.

2.3 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element.
- D. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.5 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.

2.6 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 FIRE-SUPPRESSION DEMOLITION

- A. Refer to Division 02 Section 024116.13 "Building Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove fire-suppression systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver as instructed by Commissioner.

- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division Section 211000 "Water-Based Fire Suppression System" specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.



3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section 078413 "Penetration Firestopping" for materials.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 Section 211000 "Water-Based Fire Suppression System" specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.



2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

3.5 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes.
 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete".

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section 051200 "Structural Steel Framing" and Section 055000 "Metal Fabrications".
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor fire-suppression materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.8 GROUTING

- A. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 210500

SECTION 21 08 00
COMMISSIONING OF FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This section includes commissioning process requirements for Fire Suppression systems, assemblies, and equipment.
- B. Related Sections:
1. DDC General Conditions – Section 01 91 13 “General Commissioning Requirements for MEP Systems”

1.3 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the City of New York with an unbiased, objective view of the system’s installation, operation and performance. This process does not eliminate or reduce the responsibility of the Contractor to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the City of New York.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the Contractor.
 2. Verify and document proper performance of equipment and systems.
 3. Verify that Operation & Maintenance documentation is complete and transferred to the City of New York.
 4. Verify that the City of New York’s maintenance personnel are adequately instructed.
- C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance checkouts.
- D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx

activities with the Commissioner and Contractor.

- E. The Cx process shall not reduce the responsibility of the Contractor to comply with the Contract Documents.

1.4 DEFINITIONS

- A. Refer to the DDC General Conditions for definitions.

1.5 SUBMITTALS

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s role.
- B. Refer to the DDC General Conditions Section 01 33 00 “Submittal Procedures.”
- C. In addition, provide the following:
 - 1. Certificates of readiness
 - 2. Certificates of completion of installation, prestart, and startup activities.
 - 3. O&M manuals
 - 4. Test reports

1.6 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: The Contractor will comply with test equipment manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. The Contractor shall provide all standard testing equipment for the electrical systems and controls systems in Division 21. The Contractor shall ensure a sufficient quantity of two-way radios are provided.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.
- C. The Contractor shall ensure that proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York



upon completion of the commissioning process.

- D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems
- B. Red-lined Drawings:
 - 1. The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
 - 2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 - 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 - 4. The Contractor will create the as-built drawings.
- C. Operation and Maintenance Data:
 - 1. The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
 - 2. The CxA will review the O&M literature once for conformance to project requirements.
 - 3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Instruction:
 - 1. The Contractor will provide demonstration and instruction as required by the Contract Documents.
 - 2. A complete instruction plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any instruction.
 - 3. An instruction agenda for each instruction session must be submitted to the CxA one (1) week prior the instruction session.
 - 4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and the Commissioner. A copy of the test record shall be provided to the CxA and the Commissioner.
 - 5. Engage a Factory-authorized service representative to instruct the City of New York's maintenance personnel to adjust, operate, and maintain specific equipment.
 - 6. Instruct the City of New York's maintenance personnel on procedures and schedules for

starting and stopping, trouble shooting, servicing, and maintaining equipment.

7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. The commissioning responsibilities applicable to the Division 21 trade are as follows (all references apply to commissioned equipment only):
 1. Perform commissioning tests at the direction of the CxA.
 2. Attend construction phase controls coordination meetings.
 3. Participate in Fire Suppression systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
 4. Provide information requested by the CxA for final commissioning documentation.
 5. Include requirements for submittal data, operation and maintenance data, and instruction in each purchase order or sub-contract written.
 6. Prepare preliminary schedule for Fire Suppression system orientations and inspections, operation and maintenance manual submissions, instruction sessions, equipment start-up and task completion for the City of New York. Distribute preliminary schedule to commissioning team members.
 7. Update schedule as required throughout the construction period.
 8. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for all commissioned equipment.
 9. Perform all verification and functional performance tests in the presence of the CxA as required.
 10. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
 11. Gather operation and maintenance literature on all equipment and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.
 12. Coordinate with the CxA to provide 72-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
 13. Notify the CxA a minimum of two weeks in advance for start of the testing work.
 14. Participate in, and schedule vendors and subcontractors to participate in the instruction sessions.
 15. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
 - a. Fire stopping in the fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of smoke barriers.
 - b. Fire detection and smoke detection devices furnished under other divisions of the



specification.

16. The Contractor shall ensure that the equipment suppliers shall document the performance of the equipment.
 17. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.
 18. Provide instruction to the City of New York’s maintenance personnel using expert qualified personnel, as specified.
 19. Contractor shall direct equipment suppliers to:
 - a. Provide all requested submittal data, including detailed start-up procedures and specific requirements needed to keep warranties in force.
 - b. Assist in equipment testing.
 - c. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- B. Refer to the DDC General Conditions for additional Contractor responsibilities.

3.3 CxA'S RESPONSIBILITIES

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the CxA that Fire Suppression systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the CxA that Fire Suppression instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- C. Prepare detailed testing plans, procedures, and checklists for Fire Suppression systems,

subsystems, and equipment with guidance from CxA.

- D. Tests will be performed using design conditions whenever possible, as determined by the Commissioner.
- E. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- F. The CxA may direct that set points be altered when simulating conditions is not practical.
- G. If tests cannot be completed because of a deficiency outside the scope of the Fire Suppression system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.
- H. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.6 FIRE SUPPRESSION SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 21 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CxA.
- B. Fire Detection and Alarm System Testing: Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item, device and panel section to be tested.
- C. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The scope of commissioning work shall include but not limited to the following equipment and systems:
 - 1. Fire Protection System
 - a. Wet Sprinkler Piping
 - b. Dry Sprinkler Piping
 - c. Jockey Pump
 - d. Sprinkler Booster Pump
 - e. Fire Alarm System Interactions

3.7 OPERATION AND MAINTENANCE MANUALS

- A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements.
- B. Refer to the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for the Commissioner and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.8 INSTRUCTION OF CITY OF NEW YORK PERSONNEL



- A. Refer to the DDC Standard General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to instruction.
- B. Contractor’s instruction responsibilities pertaining to Fire Suppression work:
 - 1. Provide the CxA with an Instruction Plan two weeks before the planned instruction.
 - 2. Provide comprehensive orientation and instruction in the understanding of the systems and the operation and maintenance of each major piece of commissioned Fire Suppression equipment or system to City of New York’s maintenance personnel.
 - 3. Instruction shall start with classroom sessions, if necessary, followed by hands on instruction on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
 - 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 - 5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing subcontractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment is required. More than one party may be required to execute the instruction.
 - 6. The instruction sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
 - 7. Instruction shall include:
 - a. Use the printed installation, operation and maintenance instruction material included in the O&M manuals.
 - b. Include a review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The instruction shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.
 - c. Discuss relevant health and safety issues and concerns.
 - d. Discuss warranties and guarantees.
 - e. Cover common troubleshooting problems and solutions.
 - f. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
 - g. Discuss any peculiarities of equipment installation or operation.
 - i. Hands-on instruction shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance of all pieces of equipment.



- ii. Fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.
- iii. Instruction shall occur after functional testing is complete, unless approved otherwise by the Commissioner.

END OF SECTION 21 08 00

SECTION 211000

WATER-BASED FIRE-SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following fire-suppression piping inside the building:
 - 1. Wet-pipe sprinkler systems.
 - 2. Dry-pipe sprinkler system.
- B. See Division 10 Sections 104416 "Fire Extinguisher" for cabinets and fire extinguishers.
- C. See Division 21 Section 213113 "Electric-Drive, Centrifugal Fire Pumps" for fire pumps, pressure-maintenance pumps, and pump controllers.
- D. See Division 28 Section 284600 "Fire Detection and Alarm" for alarm devices not specified in this Section.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13-2007, that have been approved by Commissioner, including hydraulic calculations.
- C. Field test reports and certificates.
- D. Field quality-control test reports.
- E. Operation and maintenance data.

1.5 PERFORMANCE REQUIREMENTS

- A. Standard Piping System Component Working Pressure: Listed for at least 175 psig (1200 kPa).
- B. Fire-suppression sprinkler system design must be approved by Commissioner.
 - 1. Margin of Safety for Available Water Flow and Pressure: 5 percent, including losses through water-service piping, valves, and backflow preventers.
 - 2. Sprinkler Occupancy Hazard Classifications:
 - a. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - b. General Storage Areas: Ordinary Hazard, Group 1.
 - c. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - d. Garage: Ordinary Hazard, Group 1.
 - e. Public Areas: Light Hazard.
 - f. Offices: Light Hazard.
 - 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm/sq.ft. over 1500 sq. ft. (4.1 L/min. per sq. m over 139 sq. m).
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm/sq.ft. over 1500 sq. ft. (6.1 over L/min. per sq. m over 139 sq. m)
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.2 gpm/sq.ft. over 1500 sq. ft. (8.2 L/min. per sq. m over 139 sq. m)
 - 4. Maximum Protection Area per Sprinkler:
 - a. Apartments, Office Spaces: 225 sq. ft. (20.9 sq. m).
 - b. Commercial Areas: 225 sq. ft. (20.9 sq. m).
 - c. Storage Areas: 130 sq. ft. (12.1 sq. m).
 - d. Mechanical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - e. Electrical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - f. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.
- C. Seismic Performance: Fire-suppression piping must be capable of withstanding the effects of earthquake motions determined according to NFPA 13-2007 and New York City Building Code, 2014 Edition.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.

- B. Installer Qualifications: Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services by a professional engineer licensed in State of New York needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - 1. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a professional engineer licensed in State of New York.
- C. Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing must comply with the following:
 - 1. New York City Building Code, 2014 Edition and Referenced NFPA 13-2007, "Installation of Sprinkler Systems."

PART 2 - PRODUCTS

2.1 STEEL PIPE AND FITTINGS

- A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, Schedule 40. Hot-dipped galvanized for dry-pipe system.
 - 1. 2" and smaller: standard weight pattern Cast Iron Threaded Fittings: ASME B16.4.
 - 2. 2-1/2" to 6": standard weight pattern malleable iron fittings: ASME B 16.3.
- B. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53, ASTM A 135, or ASTM A 795, Schedule 40, factory-formed, roll-grooved ends. Hot-dipped galvanized for dry-pipe system.
 - 1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - 1) Anvil International, Inc.
 - 2) Central Sprinkler Corp.
 - 3) Ductilic, Inc.
 - 4) JDH Pacific, Inc.
 - 5) National Fittings, Inc.
 - 6) Star Pipe Products; Star Fittings Div.
 - 7) Victaulic Co. of America.
 - 8) Approved Equal
 - b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.



- c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, pre-lubricated rubber gasket listed for use with housing, and steel bolts and nuts.

2.2 SPRINKLER SPECIALTY FITTINGS

- A. Sprinkler specialty fittings must be UL listed with 175-psig (1200-kPa) minimum working-pressure rating and made of materials compatible with piping.
- B. Outlet Specialty Fittings:
 1. Manufacturers:
 - a. Anvil International, Inc.
 - b. Central Sprinkler Corp.
 - c. Ductilic, Inc.
 - d. JDH Pacific, Inc.
 - e. National Fittings, Inc.
 - f. Shurjoint Piping Products, Inc.
 - g. Southwestern Pipe, Inc.
 - h. Star Pipe Products; Star Fittings Div.
 - i. Victaulic Co. of America.
 - j. Ward Manufacturing.
 - k. Approved Equal.
 2. Mechanical-T and -Cross Fittings: UL 213, ductile-iron housing with gaskets, bolts and nuts, and threaded, locking-lug, or grooved outlets.
 3. Snap-On and Strapless Outlet Fittings: UL 213, ductile-iron housing or casting with gasket and threaded outlet.
- C. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass, AGF Model 1000 or approved equal from the following manufacturers:
 1. Manufacturers:
 - a. Central Sprinkler Corp.
 - b. Fire-End and Croker Corp.
 - c. Viking Corp.
 - d. Victaulic Co. of America.
 - e. AGF Manufacturing Inc.
 - f. Approved Equal.
- D. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.



1. Manufacturers:
 - a. Elkhart Brass Mfg. Co., Inc.
 - b. Fire-End and Croker Corp.
 - c. Potter-Roemer; Fire-Protection Div.
 - d. Approved Equal.

E. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

1. Manufacturers:
 - a. AGF Manufacturing Co.
 - b. Central Sprinkler Corp.
 - c. G/J Innovations, Inc.
 - d. Triple R Specialty of Ajax, Inc.
 - e. Approved Equal.

F. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

1. Manufacturers:
 - a. CECA, LLC.
 - b. Merit.
 - c. Central Sprinkler Corp.
 - d. Approved Equal.

2.3 LISTED FIRE-PROTECTION VALVES

A. Valves must be UL listed or FMG approved, 175-psig minimum pressure rating.

B. Butterfly Valves, NPS 2 (DN 50) and Smaller:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Global Safety Products, Inc.
 - b. Milwaukee Valve Company.
 - c. NIBCO
 - d. Approved Equal.
2. Description:
 - a. Standard: UL 1091.
 - b. Body Materials: Bronze.
 - c. Ends: Threaded.



d. Pressure Rating: 175 psig minimum.

C. Butterfly Valves, NPS 2-1/2 (DN 65) and Larger:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NIBCO.
 - b. Central Sprinkler Corp.
 - c. Global Safety Products, Inc.
 - d. McWane, Inc.; Kennedy Valve Div.
 - e. Mueller Company.
 - f. Pratt, Henry Company.
 - g. Victaulic Co. of America.
 - h. Approved Equal.
2. Description:
 - a. CWP Rating: 250 psi wwp.
 - b. Body Material: Bronze, cast iron or ductile iron body.
 - c. Ends: Wafer type or Grooved Ends.
 - d. Internal Monitoring Switch: Required.

D. Gate Valves NPS 2 (DN 50) and Smaller:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NIBCO.
 - b. Global Safety Products, Inc.
 - c. Milwaukee Valve Company.
 - d. Approved Equal.
2. Description:
 - a. CWP Rating: 175 psi wwp.
 - b. Body Material: Bronze body.
 - c. Ends: Threaded.
 - d. Monitoring Switch: Required.
 - e. Type: OS&Y

E. Gate Valves NPS 2-1/2 (DN 65) and Larger:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NIBCO.
 - b. Global Safety Products, Inc.



- c. Milwaukee Valve Company.
 - d. Approved Equal.
 - 2. Description:
 - a. CWP Rating: 175 psi wwp.
 - b. Body Material: Cast iron or ductile iron.
 - c. Ends: Flanged.
 - d. Monitoring Switch: Required.
 - e. Type: OS&Y
- F. Check Valves NPS 2 (DN 50) and Smaller:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NIBCO.
 - b. Global Safety Products, Inc.
 - c. Milwaukee Valve Company.
 - d. Approved Equal.
 - 2. Description:
 - a. CWP Rating: 175 psi wwp.
 - b. Body Material: Bronze body.
 - c. Ends: Threaded.
 - d. Type: Spring Actuated.
- G. Check Valves NPS 2-1/2 (DN 65) and Larger:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NIBCO.
 - b. Global Safety Products, Inc.
 - c. Milwaukee Valve Company.
 - d. Approved Equal.
 - 2. Description:
 - a. CWP Rating: 175 psi wwp.
 - b. Body Material: cast iron or ductile iron.
 - c. Ends: Threaded.
 - d. Type: Spring Actuated.

2.4 SPRINKLERS

- A. Sprinklers must be UL listed or FMG approved, quick response, standard spray, with 175-psig (1200-kPa) minimum pressure rating.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Central Sprinkler Corp.
 - 2. Globe Fire Sprinkler Corporation.
 - 3. Grinnell Fire Protection.
 - 4. Reliable Automatic Sprinkler Co., Inc.
 - 5. Star Sprinkler Inc.
 - 6. Victaulic Co. of America.
 - 7. Viking Corp.
 - 8. Approved Equal.
- C. Automatic Sprinklers: With heat-responsive element complying with the following:
 - 1. UL 199, for nonresidential applications.
- D. Sprinkler Types and Categories: Quick response, nominal 1/2-inch (12.7-mm) orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.
- E. Sprinkler types, features, and options as follows:
 - 1. Concealed ceiling sprinklers, including cover plate.
 - 2. Pendent sprinklers.
 - 3. Quick-response sprinklers.
 - 4. Concealed sidewall sprinklers, including escutcheon.
 - 5. Upright sprinklers.
- F. Sprinkler Finishes: White unless otherwise shown on drawings.
- G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Plastic, white finish, one piece, flat; unless otherwise shown on drawings
- H. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

2.5 ALARM DEVICES

- A. Alarm-device types must match piping and equipment connections.
- B. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig (1725-kPa) pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ADT Security Services, Inc.
 - b. Grinnell Fire Protection.
 - c. ITT McDonnell & Miller
 - d. Potter Electric Signal Company.
 - e. System Sensor.
 - f. Viking Corp.
 - g. Approved Equal.
- C. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. McWane, Inc.; Kennedy Valve Div.
 - b. Potter Electric Signal Company.
 - c. System Sensor.
 - d. Approved Equal.

2.6 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AGF Manufacturing Co.
 - 2. AMETEK, Inc.; U.S. Gauge.
 - 3. Brecco Corporation.
 - 4. Dresser Equipment Group; Instrument Div.
 - 5. Marsh Bellofram.
 - 6. WIKA Instrument Corporation.
 - 7. Approved Equal.

- B. Description: UL 393, 3-1/2- to 4-1/2-inch (90- to 115-mm-) diameter, dial pressure gage with range of 0 to 250 psig (0 to 1725 kPa) minimum.
1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.

2.7 SIAMESE CONNECTIONS

- A. Basis-of-Design Product: Subject to the compliance with requirements, provide siamese connection two-way type, having a cast brass clapper body, polished brass plate, two polished brass double female snoots with rigid end NYFD threads, pin lug thread swivels with plug and chain. Siamese connection Potter- Roemer Model 5023 or comparable product by one of the following:
1. Elkhart Brass Manufacturing Co.
 2. Viking Corp.
 3. Approved Equal.
- B. Siamese connection must be polished chrome plated. Lettering must be "AUTO SPKR".

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING APPLICATIONS, GENERAL

- A. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.3 WET SPRINKLER SYSTEM PIPING APPLICATIONS

- A. NPS 2 (DN 50) and Smaller: Threaded-end, black, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
- B. NPS 2-1/2" (DN 65) and Larger: Grooved-end, black, standard-weight steel pipe; grooved-end malleable-iron fittings; grooved-end-pipe couplings; and grooved joints.

3.4 DRY-PIPE SPRINKLER SYSTEM PIPING APPLICATIONS

- A. NPS 2-1/2" (DN 65) and Smaller: Threaded-end, hot-dipped galvanized, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
- B. NPS 2-1/2" (DN 65) and Larger: Grooved-end, hot-dipped galvanized, standard-weight steel pipe; grooved-end malleable-iron fittings; grooved-end-pipe couplings; and grooved joints.

3.5 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used.
- B. Flanged OS&Y gate valves must be used on fire services and for fire pump.
- C. Where specific valve types are not indicated, the following requirements apply:
 - 1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NYC Building Code - 2014 and referenced standards.
 - a. Shutoff Duty: Gate valves.

3.6 JOINT CONSTRUCTION

- A. Refer to Division 21 Section 210500 "Common Work Results for Fire Suppression" for basic piping joint construction.
- B. Threaded Joints: Comply with NFPA 13-2007 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 and threads are checked by a ring gage and comply with ASME B1.20.1.
- C. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.
 - 1. Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.
 - 2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.

3.7 SERVICE-ENTRANCE PIPING

- A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 22 Section 221113 "Facility Water Distribution Piping" for exterior piping.

- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Refer to Division 22 Section 221119 "Domestic Water Piping Specialties" for backflow preventers.
- C. Fire Protection Service and backflow preventer must be installed by licensed Plumber. Alarm Devices for service and backflow preventer valves must be provided by Contractor.

3.8 PIPING INSTALLATION

- A. Refer to Division 21 Section 210500 "Common Work Results for Fire Suppression" for basic piping installation.
- B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval Commissioner. File written approval with Commissioner before deviating from approved working plans.
- C. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.
- E. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger connections.
- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13-2007.
- G. Install sprinkler piping with drains for complete system drainage.
- H. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- I. Provide pressure relief valve downstream from all pressure reducing valves. Set pressure relief valve at 175 psi as recommended by pressure reducing valve manufacturer.
- J. Install drain valves on standpipes.
- K. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.
- L. Install alarm devices in piping systems.

- M. Hangers and Supports: Comply with NFPA 13-2007 for hanger materials.
 - 1. Install sprinkler system piping according to NFPA 13-2007.
- N. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- O. Fill wet-standpipe system piping with water.
- P. Fill wet-pipe sprinkler system piping with water.
- Q. Connect compressed-air supply to dry-pipe sprinkler piping.
- R. Connect air compressor to the following piping and wiring:
 - 1. Pressure gages and controls.
 - 2. Electrical power system.
 - 3. Fire-alarm devices, including low-pressure alarm.
- S. Drain dry-pipe sprinkler piping.
- T. Pressurize and check dry-pipe sprinkler system piping, air-pressure maintenance devices and air compressors.
- U. Install dry-pipe auxiliary drains at low points or sections with entrapped water in dry-pipe piping.

3.9 VALVE INSTALLATION

- A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13-2007.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.
- D. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.10 SPRINKLER APPLICATIONS

- A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:
1. Rooms without Ceilings: Upright sprinklers.
 2. Rooms with Suspended Ceilings: Concealed sprinklers.
 3. Sprinkler Finishes:
 - a. Upright, Pendent, and Concealed Sidewall Sprinklers: White unless otherwise shown on drawings or approved by Commissioner.
 - b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate or non-ferrous finish where shown on construction drawings.
 - c. Flush Sprinklers: Bright chrome, with painted white escutcheon.

3.11 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.
- B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.
- C. Provide UL-listed protective guards for upright or pendent sprinklers in all electrical and IT closets or where sprinkler heads are subject to damage or installed lower than 7.5 ft from floor.
- D. Provide 12 spare heads for each type of sprinklers used in the building. Located heads in Spare Head Boxes in Fire Pump Room.

3.12 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-water piping and fire-suppression piping. Refer to Division 22 Section 221119 "Domestic Water Piping Specialties" for backflow preventers.
- D. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.
- E. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

- F. Electrical Connections: Power wiring is specified in Division 26.
- G. Connect alarm devices to fire alarm.
- H. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.13 LABELING AND IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in New York City Building Code – 2014.
- B. Pipes and Valves must be painted in accordance with New York City Building Code-2014.

3.14 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Hydrostatic Test: Fire Protection system must be tested hydrostatically at not less than 200 psi (20.7 bar) of pressure for on (1) hour. For systems where the maximum system pressure exceeds 250 psi (17.2 bar), such systems must be tested for 1 hour at a minimum pressure of 50 psi (3.5 bar) above maximum expected system pressure.
 - 2. Leak Test: After installation, charge system and test for leaks. Fix leaks and retest until no leaks exist.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13-2007, "Systems Acceptance" Chapter.
 - 4. Coordinate with fire alarm tests. Operate as required.
 - 5. Verify that equipment hose threads are same as local fire department equipment.
- B. Report test results promptly and in writing to Commissioner.

END OF SECTION 211000



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SECTION 213113

ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes electric-drive, split-case centrifugal and vertical fire pumps, and the following:
1. Full-service fire-pump controllers.
 2. Fire-pump accessories and specialties.
 3. Pressure-maintenance pumps, controllers, accessories, and specialties.
 4. Alarm panels.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.
- B. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.
- C. Source quality-control test reports.
- D. Field quality-control test reports.
- E. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Source Limitations: Obtain fire pumps, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100 and marked for intended use.
- D. Comply with NFPA 20-2007 "Installation of Stationary Pumps for Fire Protection" standards pertaining to materials, hose threads, and installation.
- E. Comply with NFPA 20-2007 "Installation of Stationary Pumps for Fire Protection" for fire pumps, drivers, controllers, accessories, and their installation.

PART 2 - PRODUCTS

2.1 FIRE PUMPS

- A. Basis-of-Design Product: subject to compliance with requirements, provide fire pump Aurora Pump Model 4-383-7B, vertical mounted, inline, centrifugal pump or comparable product by one of the following:
 - 1. GA Fleet, Inc
 - 2. Fairbanks.
 - 3. Patterson.
 - 4. Or Approved Equal.
- B. Fire pump system will be vertical inline Fire Pump System complete with pump, driver, controller, and accessories. The pumping unit must be listed by Underwriters Laboratories, Inc., and approved by Associated Factory Mutual. The NYC MEA # is 261-03-E. The pumping unit will meet all requirements of the National Fire Protection Association Pamphlet #20. The fire pump must be designed to deliver 500 GPM when operating at 60 PSIG boost. The pump must also deliver not less than 150% of rated capacity at a pressure not less than 65% of rated pressure. The shut off pressure must not exceed 150% of rated pressure. Suction pressure is 30 PSI. The pump must operate at a maximum speed of 3550 RPM.
- C. The driver will be a Vertical solid shaft 25HP open drip-proof certified and rated for Fire Service, ball bearing type, AC, induction, squirrel cage motor; 208 Volts, 3 Phase, 60 Cycles. Locked rotor current will not exceed the values specified in NFPA Pamphlet #20.
- D. Fire Pump will be furnished with a cast iron motor bracket which is bolted to the vertical casing, the motor bracket will be machined with a register fit to ensure proper alignment of motor and

pump shaft. Pump and motor will be checked for alignment before and after the pump has been installed and grouted in place.

- E. Casings will be of cast iron having a minimum tensile strength of 30,000 pounds. Bearing housing supports, and suction and discharge flanges will be integrally cast with the lower half of the casing. Removal of the upper half of the casing must allow the rotating element to be removed without disconnecting the suction and discharge flanges.
- F. Impellers will be of the enclosed type and will be bronze. Impellers will be dynamically balanced, keyed to the shaft, and held in place with threaded shaft sleeves.
- G. The pump shaft will be made of SAE 1045 steel or equal, accurately machined to give a true running rotating element. Shaft will be protected by bronze sleeves which are key locked and threaded so that the sleeves tighten with the rotation of the shaft. A O ring will seal between the impeller hub and the shaft sleeve to protect the pump shaft.
- H. Pump will be equipped with renewable casing rings so designed that hydraulic pressure will seat them against a shoulder in the pump case around the full periphery of the wearing ring. The wearing rings will be locked by doweling to prevent rotation. The rotating element uses heavy duty grease lubricated ball bearings and will be equipped with the water slingers. Bearing housings will be so designed to flush lubricant through the bearing.
- I. All packed pumps will be provided with a lantern ring connected to the pressure side of pump. Stuffing boxes will be equipped with split packing glands designed for easy removal for packing inspection and maintenance.
- J. The pumping unit will include the following accessories:
 - 1. Eccentric tapered suction reducer
 - 2. Concentric tapered discharge increaser
 - 3. Hose Valves
 - 4. Caps and Chains
 - 5. Hose Valve Header
 - 6. Pressure Gauges
 - 7. Main Relief Valve
 - 8. Circulation/Casing Relief Valve
 - 9. Relief Cone-Enclosed
 - 10. Automatic Air Release Valve
 - 11. Balldrip Valve
 - 12. Fire Flow Metering System
- K. The fire pump motor control will be completely assembled, wired and tested by the manufacturer before shipment from the factory, and will be marked "Fire Pump Controller". The controller will be located as close to as practical and within sight of the motor. The controller will be so located or protected that it will not be injured by water escaping from the pump or connection. The controller will be of the combined manual and automatic, Autotransformer Soft Starting type, rated for

fire protection use UL listed and FM approved, and will be complete with: externally operable disconnect switch, circuit breaker with an interrupting capacity of 100,000 amperes, magnetic starter, pressure switch, pilot lamp to indicate circuit breaker closed and power available, plus manual start-stop feature.

2.2 JOCKEY PUMP

- A. Basis-of-Design Product: subject to compliance with requirements, provide a Sta-Rite Model HP jockey pump, to operate at 3550 RPM with a capacity of 5 GPM at a 66 PSIG boost, or comparable product by one of the following:
1. Aurora.
 2. Fairbanks.
 3. Patterson.
 4. Or Approved Equal.
- B. The pump will be bronze fitted construction and equipped with a mechanical seal. Unit will be close coupled and driven by a 3/4 HP, 208 volt, 3 phase, 60 cycle, ODP motor. The pump will be equipped with a relief valve.
- C. The jockey pump control panel will be NEMA II, wall mounted, and contain a fused disconnect switch, magnetic A-T-L starter, H-O-A selector switch, overload relays, and necessary circuitry to provide automatic start and stop from panel mounted pressure switch.

2.3. PRESSURE GAGES

- A. Description: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter dial with range of 0- to 250-psig minimum. Include caption "WATER" on dial face.
1. Manufacturers:
 - a. AGF Manufacturing Co.
 - b. AMETEK, Inc.; U.S. Gauge.
 - c. Brecco Corporation.
 - d. Dresser Equipment Group; Instruments Div.
 - e. Marsh Bellofram.
 - f. WIKA Instrument Corporation.
 - g. Or Approved Equal.

2.4. GROUT

- A. Description: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.

2. Properties: Nonstaining, noncorrosive, and nongaseous.
3. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

2.5 SOURCE QUALITY CONTROL

- A. Test and inspect fire pumps with their controllers according to NFPA 20 for certified shop tests.
- B. Verification of Performance: Rate fire pumps according to requirements indicated.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 CONCRETE BASES

- A. Install concrete bases of dimensions indicated for fire pumps, pressure-maintenance pumps, and controllers. Refer to Division 21 Section 210500 "Common Work Results for Fire Suppression."
 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 INSTALLATION

- A. Install and align fire pump, pressure-maintenance-pump, and controller according to NFPA 20.
- B. Install pumps and controllers to provide access for periodic maintenance including removal of motors, impellers, couplings, and accessories.
- C. Set base-mounting-type pumps on concrete bases. Disconnect coupling halves before setting. Do not reconnect couplings until alignment operations have been completed.



1. Support pump baseplate on rectangular metal blocks and shims or on metal wedges having small taper, at points near anchor bolts to provide 3/4- to 1-1/2-inch (19- to 38-mm) gap between pump base and foundation for grouting.
 2. Adjust metal supports or wedges until pump and driver shafts are level. Verify that coupling faces and pump suction and discharge flanges are level and plumb.
- D. Install suction and discharge piping equal to or greater than diameter of fire-pump nozzles.
- E. Install valves that are same size as piping connecting fire pumps, bypasses, test headers, and other piping systems.
- F. Install pressure gages on fire-pump suction and discharge at pressure-gage tappings.
- G. Support pumps and piping separately so weight of piping does not rest on pumps.
- H. Install piping accessories, hangers and supports, anchors, valves, meters and gages, and equipment supports.
- I. Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.
- J. Align split-case fire-pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.
- K. After alignment is correct, tighten anchor bolts evenly. Fill baseplate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.
- L. Align piping connections.
- M. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.
- N. Piping installation requirements are specified in Division 211000 Section "Water-Based Fire-Suppression Systems." Drawings indicate general arrangement of piping, fittings, and specialties.
- O. Install piping adjacent to pumps and equipment to allow service and maintenance.
- P. Connect water supply and discharge piping to fire pumps. Connect water supply and discharge piping to pressure-maintenance pumps.
- Q. Connect relief-valve discharge to point of disposal.
- R. Connect controllers to pumps.



- S. Connect fire-pump controllers to building fire-alarm system. Refer to Division 28 Section 284600 "Fire Detection and Alarm."
- T. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."
- U. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform field tests for each fire pump when installation is complete. Comply with operating instructions and procedures in NFPA 20-2007 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or that does not perform as indicated, then retest to demonstrate compliance. Verify that each fire pump performs as indicated.
- C. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Fix leaks and retest until no leaks exist.
 - 2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:
 - a. Lubricate oil-lubrication-type bearings.
 - b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
 - c. Disconnect coupling and check electric motor for proper rotation. Rotation will match direction of rotation marked on pump casing.
 - d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.
 - 3. Starting procedure for pumps is as follows:
 - a. Prime pump by opening suction valve and closing drains and prepare pump for operation.
 - b. Open sealing-liquid supply valves if pump is so fitted.
 - c. Start motor.
 - d. Open discharge valve slowly.



- e. Observe leakage from stuffing boxes and adjust sealing-liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately but let packing run in before reducing leakage through stuffing boxes.
 - f. Check general mechanical operation of pump and motor.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to instruct City of New York maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance pumps. Also refer to DDC General Conditions.

END OF SECTION 213113

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
 2. Dielectric fittings.
 3. Mechanical sleeve seals.
 4. Sleeves.
 5. Escutcheons.
 6. Grout.
 7. Plumbing demolition.
 8. Equipment installation requirements common to equipment sections.
 9. Concrete bases.
 10. Supports and anchorages.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “ Submittal Procedures”.

1.4 SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

- C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

- D. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment must comply with requirements.

1.6 DEFINITIONS

- A. Finished Spaces: Spaces other than plumbing and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and plumbing equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12.
- G. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.
- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

- B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element.
- D. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated and rough brass.

2.7 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.



1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PLUMBING DEMOLITION

- A. Refer to Division 02 Section 024116.13 "Building Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to the Commissioner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.



- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above ceilings to allow sufficient space for access panel access.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section 078413 "Penetration Firestopping" for materials.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:



1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair and replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section 033000 "Cast-in-Place Concrete" and Section 033300 "Architectural Concrete".

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section 051200 "Structural Steel Framing" and Section 055000 "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.10 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 220500

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SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze ball valves.
3. Iron, single-flange butterfly valves.
4. Bronze swing check valves.
5. Iron swing check valves.
6. Iron swing check valves with closure control.
7. Bronze gate valves.
8. Iron gate valves.
9. Bronze globe valves.
10. Iron globe valves.

B. Related Sections:

1. Division 22 plumbing piping Sections 221113, 221116, 221316, 221413 for specialty valves applicable to those Sections only.
2. Division 22 Section 220523 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 LEAD-FREE” CERTIFICATION

- A. All products to be used in Domestic Hot and Cold Water systems must have “LEAD-FREE” certification.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller except plug valves.
- E. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:
 - 1. Gate Valves: With rising stem.
 - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
 - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 - 2. Solder Joint: With sockets according to ASME B16.18.
 - 3. Threaded: With threads according to ASME B1.20.1.



2.2 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, “Lead-Free” certified, Bronze Ball Valves with Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Crane Co.; Crane Valve Group; Crane Valves.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - g. Approved Equal.
 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Bronze.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.

2.3 BRONZE SWING CHECK VALVES

- A. Class 125, “Lead-Free” certified, Bronze Swing Check Valves with Bronze Disc:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. American Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - g. Approved Equal.
 2. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 200 psig (1380 kPa).



- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

2.4 BRONZE GATE VALVES

A. Class 125, “Lead-Free” certified, RS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. American Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - g. Approved Equal.
- 2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron.

2.5 IRON GATE VALVES

A. Class 125, OS&Y, Iron Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - g. Approved Equal.



2. Description:

- a. Standard: MSS SP-70, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Disc: Solid wedge.
- g. Packing and Gasket: Asbestos free.

2.6 BRONZE GLOBE VALVES

A. Class 125, “Lead-Free” certified, Bronze Globe Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. Hammond Valve.
- d. Kitz Corporation.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell Valves.
- h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- i. Approved Equal.

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded.
- e. Stem and Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball or gate valves.
 - 2. Throttling Service: Globe valves.
 - 3. Pump-Discharge Check Valves:
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Domestic Water Service Pipe NPS 3 (DN 75) and Smaller (including MOCV and MICV):
 - 1. Iron Gate Valves, NPS 2-1/2 to NPS 4 (DN 65 to NPS 100) with flanged ends, Class 125, OS&Y.
- B. Distribution Pipe NPS 2 (DN 50) and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Bronze Angle Valves: Class 125, bronze disc.



3. Ball Valves: Two piece, full port, bronze with bronze trim.
4. Bronze Swing Check Valves: Class 125, bronze disc.
5. Bronze Gate Valves: Class 125, RS.
6. Bronze Globe Valves: Class 125, bronze disc.

END OF SECTION 220523

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SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following:
1. Steel pipe hangers and supports.
 2. Trapeze pipe hangers.
 3. Metal framing systems.
 4. Thermal-hanger shield inserts.
 5. Fastener systems.
 6. Equipment supports.
- B. See Division 05 Section 051200 "Structural Steel Framing" and Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Steel pipe hangers and supports.
 2. Thermal-hanger shield inserts.
 3. Powder-actuated fastener systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Equipment supports.

C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.

1.6 DEFINITIONS

- A. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.7 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment and certified by professional engineer licensed in the State of New York.

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 1. AAA Technology & Specialties Co., Inc.
 2. Bergen-Power Pipe Supports.
 3. B-Line Systems, Inc.; a division of Cooper Industries.
 4. Carpenter & Paterson, Inc.



5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.
15. Approved Equal.

- C. Galvanized, Metallic Coatings: Pre-galvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.
8. Approved Equal.

- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- (690-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.
 - 3. PHS Industries, Inc.
 - 4. Pipe Shields, Inc.
 - 5. Approved Equal
- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield must cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield must cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. Masterset Fastening Systems, Inc.
 - d. Powers Fasteners.
 - e. Approved Equal.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:



- a. B-Line Systems, Inc.; a division of Cooper Industries.
- b. Empire Industries, Inc.
- c. Hilti, Inc.
- d. Powers Fasteners.
- e. Approved Equal.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.7 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.

- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F (49 to 232 deg C) pipes, NPS 4 to NPS 16 (DN 100 to DN 400), requiring up to 4 inches (100 mm) of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24 (DN 20 to DN 600), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
 5. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
 6. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange.
 7. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 8. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.



2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb (340 kg).
 - b. Medium (MSS Type 32): 1500 lb (680 kg).
 - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
 2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fastener or mechanical-expansion anchors instead of building attachments where required in concrete construction.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install powder-actuated fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, [NPS 2-1/2 (DN 65)] and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

- K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- M. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields must span an arc of 180 degrees.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - 5. Pipes NPS 8 (DN 200) and Larger: Include wood inserts.
 - 6. Insert Material: Length at least as long as protective shield.
 - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.4 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.5 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.6 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.7 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint and restore to comply with ASTM A 780.

END OF SECTION 220529

SECTION 22 05 33

HEAT TRACING FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENT:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes plumbing piping heat tracing for freeze prevention.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.
 - 1. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.
- B. Shop Drawings for Snow Melting System: Include plans, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and maintenance data.
- E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality requirements”.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100, by a testing agency acceptable to City of New York and marked for intended use.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace electric heating cable that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES FOR FREEZE PROTECTION:

- A. Basis of Design Product: Subject to compliance with requirements, provide products by Raychem; a division of Pentair Thermal Management (XL Trace) or comparable product by one of the following:
 - 1. Danfoss, Inc.
 - 2. Briskheat, Inc
 - 3. Technitrace
 - 4. Or Approved Equal
- B. Heating Element: Pair of parallel No. 16 AWG, nickel-coated, stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory-assembled non-heating leads with connectors at one end, and seal the opposite end watertight. Cable must be capable of crossing over itself once without overheating.
- C. Electrical Insulating Jacket: Flame-retardant polyolefin.
- D. Cable Cover: Tinned copper braid, and polyolefin outer jacket with UV inhibitor.
- E. Maximum Operating Temperature (Power On): 150 deg F
- F. Maximum Exposure Temperature (Power Off): 185 deg F
- G. Maximum Operating Temperature: 300 deg F
- H. Capacities and Characteristics:
 - 1. Maximum Heat Output 8 W/ft.



2. Number of Parallel Cables: 1
3. Spiral Ratio: 1.3
4. Volts: 208 V.
5. Phase: 1 phase
6. Hertz: 60
7. Maximum heater length :250 ft for each 30 amp breaker rating.

- I. Multiple Circuits: Where the rating of the activator would be exceeded, it must be used in conjunction with a Relay Panel for activation of multiple heater circuits.

2.2 POWER DISTRIBUTION PANELS

- A. Provide dedicated power distribution, control, ground-fault protection, monitoring, and alarm panel . This system is used for freeze protection control, broadband maintenance temperature control, or applications in which multiple circuits (branch circuit breakers) are energized at one time.
- B. The panel must consist of wall-mounted enclosure contains an assembled panelboard, main contractor. Main contactor can be an ambient sensing thermostat (mounted remotely), an electronic controller, a snow sensor controller, or any device with a contact that changes state when the heat tracing is energized.
- C. Enclosure must be NEMA 4 rated.
- D. Contractor must determine required no of breakers based on total # of circuits.

2.3 CONTROLS

- A. Pipe-Mounting Thermostats for Freeze Protection:
 1. Remote bulb unit with adjustable temperature range from 30 to 50 deg F.
 2. Snap action; open-on-rise, single-pole switch with minimum current rating adequate for connected cable.
 3. Remote bulb on capillary, resistance temperature device, or thermistor for directly sensing pipe-wall temperature.
 4. Corrosion-resistant, waterproof control enclosure.

2.4 ACCESSORIES

- A. Cable Installation Accessories: Fiberglass tape, heat-conductive putty, cable ties, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.
- B. Warning Labels: Refer to Division 26 Section 260553 " Identification for Electrical Work"

- C. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils thick, and with pressure-sensitive, permanent, waterproof, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 APPLICATIONS

- A. Install the following types of electric heating cable for the applications described:
 - 1. Freeze Protection: Self-regulating, parallel-resistance heating cable.

3.3 INSTALLATION

- A. Install electric heating cable for new plumbing piping. Refer to Plumbing drawings for exact length of heat traced pipes.
- B. Install systems and components in accordance to manufacturer's recommendations.
- C. Electric Heating Cable Installation for Freeze Protection for Piping:
 - 1. Install electric heating cables after piping has been tested and before insulation is installed.
 - 2. Install electric heating cables according to IEEE 515.1.
 - 3. Install insulation over piping with electric cables according to Division 22 Section 220700 "Plumbing Insulation."
 - 4. Install warning tape on piping insulation where piping is equipped with electric heating cables.
- D. Set field-adjustable switches and circuit-breaker trip ranges.
- E. Protect installed heating cables, including non-heating leads, from damage.
- F. Ground equipment according to Division 26 Section 260533 "Grounding and Bonding for Electrical Systems."
- G. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

- H. System test and initial start-up must be proved in presence of manufacturer’s representative.

3.4 FIELD QUALITY CONTROL

- A. Testing: Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
 - 1. Test cables for electrical continuity and insulation integrity before energizing.
 - 2. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.
- B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounting cables.
- C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 26 05 35



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SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes:
1. Equipment labels.
 2. Warning signs and labels.
 3. Pipe labels.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop drawings: show locations, mock-up labels for font, size, layout.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:



1. Material and Thickness: Brass, 0.032-inch (0.8-mm) or Stainless steel, 0.025-inch (0.64-mm), Aluminum, 0.032-inch (0.8-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screw.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule must be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: Yellow.

- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction. Indicate on shop drawings location, provide mockup of labels for font, size, layout.
- B. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches (38 mm) high.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section 099000 "Painting and Coating".
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
 - 8. Where possible, align center line of labels with adjacent labels.
- C. Pipe Label Color Schedule:
 - 1. Domestic Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.
 - 2. Sanitary Waste, Vent and Storm Drainage Piping:
 - a. Background Color: White.
 - b. Letter Color: Green.
 - 3. Compressed Air Piping:
 - a. Background Color: White.
 - b. Letter Color: Blue.

END OF SECTION 220553

SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Insulation Materials:
 - a. Flexible elastomeric.
 - b. Mineral fiber.
 - c. Polyolefin.
2. Insulating cements.
3. Adhesives.
4. Mastics.
5. Sealants.
6. Factory-applied jackets.
7. Field-applied fabric-reinforcing mesh.
8. Field-applied jackets.
9. Tapes.
10. Securements.
11. Corner angles.

B. Related Sections include the following:

1. Division 23 Section 230700 "HVAC Insulation."

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.
8. Detail field application for each equipment type.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.

B. Fire-Test-Response Characteristics: Insulation and related materials must have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 by nationally recognized testing laboratories . Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials must be applied.
- B. Products must not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel must have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.



- D. Insulation materials for use on austenitic stainless steel must be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials must not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - f. Approved equal
 - 2. Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. (40 kg/cu. m) or more. Thermal conductivity (k-value) at 100 deg F (55 deg C) is 0.29 Btu x in./h x sq. ft. x deg F (0.042 W/m x K) or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Manson Insulation Inc.; AK Flex.
 - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
 - f. Approved Equal

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.



1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Insulco, Division of MFS, Inc.; SmoothKote.
 - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
 - c. Rock Wool Manufacturing Company; Delta One Shot.
 - d. Approved equal.

2.3 ADHESIVES

- A. Materials must be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Approved equal.
- C. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Approved equal.
- D. PVC Jacket Adhesive: Compatible with PVC jacket.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:



- a. Dow Chemical Company (The); 739, Dow Silicone.
- b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
- c. P.I.C. Plastics, Inc.; Welding Adhesive.
- d. Red Devil, Inc.; Celulon Ultra Clear.
- e. Speedline Corporation; Speedline Vinyl Adhesive.
- f. Approved equal

2.4 MASTICS

- A. Materials must be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 - g. Approved equal
 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-10.
 - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
 - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
 - d. Marathon Industries, Inc.; 550.
 - e. Mon-Eco Industries, Inc.; 55-50.
 - f. Vimasco Corporation; WC-1/WC-5.
 - g. Approved equal



2. Water-Vapor Permeance: ASTM F 1249, 3 perms (2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 200 deg F (Minus 29 to plus 93 deg C).
4. Solids Content: 63 percent by volume and 73 percent by weight.
5. Color: White.

2.5 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
 - f. Vimasco Corporation; 750.
 - g. Approved equal.
2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-70.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Approved equal.
3. Materials must be compatible with insulation materials, jackets, and substrates.
4. Permanently flexible, elastomeric sealant.
5. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
6. Color: White or gray.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.



- c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Approved equal.
2. Materials must be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
 5. Color: Aluminum.
- C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Approved equal.
 2. Materials must be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
 5. Color: White.

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2.7 FIELD-APPLIED JACKETS

- A. Field-applied jackets must comply with ASTM C 921, Type I, unless otherwise indicated.
- B. Aluminum Jacket.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.



1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 - e. Approved equal.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
5. Factory-fabricated tank heads and tank side panels.

2.8 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Approved equal.
 2. Width: 3 inches (75 mm).
 3. Thickness: 11.5 mils (0.29 mm).
 4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.



1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 - e. Approved equal.
2. Width: 2 inches (50 mm).
3. Thickness: 6 mils (0.15 mm).
4. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

2.9 SECUREMENTS

- A. Aluminum Bands: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 3/4 inch (19 mm) wide with wing or closed seal.
 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
 - d. Approved equal.
- B. Insulation Pins and Hangers:
 1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
 - 2) GEMCO; Perforated Base.
 - 3) Midwest Fasteners, Inc.; Spindle.
 - 4) Approved equal.



- b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
 - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) GEMCO; Nylon Hangers.
 - 2) Midwest Fasteners, Inc.;
 - 3) Nylon Insulation Hangers.
 - 4) Approved equal.
 - b. Baseplate: Perforated, nylon sheet, 0.030 inch (0.76 mm) thick by 1-1/2 inches (38 mm) in diameter.
 - c. Spindle: Nylon, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches (63 mm).
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
 - 2) GEMCO; Press and Peel.
 - 3) Midwest Fasteners, Inc.; Self Stick.
 - 4) Approved equal.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
 - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.



- d. Adhesive-backed base with a peel-off protective cover.
- 4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following products:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
 - 5) Approved Equal.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- 5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) GEMCO.
 - 2) Midwest Fasteners, Inc.
 - 3) Nelson Stud Welding.
 - 4) Approved Equal.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.
- D. Wire: 0.080-inch (2.0-mm) nickel-copper alloy.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.
 - d. RPR Products, Inc.
 - e. Approved Equal.

2.10 CORNER ANGLES

- A. PVC Corner Angles: 30 mils (0.8 mm) thick, minimum 1 by 1 inch (25 by 25 mm), PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.

- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm) o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Restore joint separations and cracking due to thermal movement.

- O. Restore damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
 - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.



- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Division 07 Section 078413 " Penetration Firestopping" and Section 079200 "Joint Sealants".
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section 078413 "Penetration Firestopping".

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece must be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.



6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation must conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 CELLULAR-GLASS INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:



1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) o.c.



4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.



1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.
- D. Where PVDC jackets are indicated, install as follows:
1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
 2. Wrap factory-presize jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presize jacket with an approximate overlap at butt joint of 2 inches (50 mm) over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
 3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
 4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches (850 mm) or less. The 33-1/2-inch- (850-mm-) circumference limit allows for 2-inch- (50-mm-) overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
 5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.9 FINISHES

- A. Equipment and Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 Section 099000 "Painting and Coating".
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Commissioner. Vary first and second coats to allow visual inspection of the completed Work.

- D. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect field-insulated equipment, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection must be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
 - 2. Inspect pipe, fittings, strainers, and valves, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection must be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Underground piping.
 - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Hot Water and Recirculated Hot Water: Insulation must be the following:
 - 1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket and PVC fittings, Type I: 1 inch for all pipes including branches. For exposed pipe jacketing refer to section 3.16.

- B. Domestic Cold Water: Insulation must be the following:
 - 1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jackets and PVC fittings, Type I: 1 inch for all pipes including branches. For exposed pipe jacketing refer to section 3.12.
- C. Storm Water Pipes (Horizontal and Vertical):
 - 1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket and PVC fittings, Type I: 1inch for all pipes including branches. For exposed pipe jacketing refer to section 3.16.
- D. Sanitary Pipes with Heat tracing:
 - 1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket and PVC fittings, Type I: 1inch for all pipes including branches. For exposed pipe jacketing refer to section 3.16.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. None.
- D. Hot, Hot Water Return and Cold Water Piping and Sanitary Pipes, Exposed on Apparatus Floor or in finish areas on 2nd floor:
 - 1. Aluminum Jacket
- E. Hot, Hot Water Return and Cold Water Piping, Exposed in Mechanical Rooms
 - 1. PVC: 20 mils (0.5 mm) thick.

END OF SECTION 220700

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SECTION 22 08 00 COMMISSIONING OF PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This section includes commissioning process requirements for Plumbing systems, assemblies, and equipment.
- B. Related Sections:
 - 1. DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems.”

1.3 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the City of New York with an unbiased, objective view of the system’s installation, operation and performance. This process does not eliminate or reduce the responsibility of the Contractor to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the City of New York.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
 - 1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the Contractor.
 - 2. Verify and document proper performance of equipment and systems.
 - 3. Verify that Operation & Maintenance documentation is complete and transferred to the City of New York.
 - 4. Verify that the City of New York’s maintenance personnel are adequately instructed.
- C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance checkouts.
- D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx activities with the Commissioner, and the Contractor.
- E. The Cx process shall not reduce the responsibility of the Contractor to comply with the Contract Documents.

1.4 DEFINITIONS



- A. Refer to the DDC General Conditions for definitions.

1.5 SUBMITTALS

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s role.
- B. Refer to the DDC General Conditions Section 013300 “Submittal Procedures” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for specific requirements. In addition, provide the following:
 - 1. Certificates of readiness
 - 2. Certificates of completion of installation, prestart, and startup activities.
 - 3. O&M manuals
 - 4. Test reports

1.6 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: The Contractor will comply with test manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the plumbing trade subcontractor under the direction of the Contractor shall ultimately be responsible for all standard testing equipment for the plumbing system in Division 22, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by the Contractor.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.
- C. The Contractor shall ensure proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment, if provided by the CxA, shall not become the property of the City of New York.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers

shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for commissioned components, equipment, and systems.
- B. Red-lined Drawings:
 - 1. The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
 - 2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 - 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 - 4. The Contractor will create the as-built drawings.
- C. Operation and Maintenance Data:
 - 1. The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
 - 2. The CxA will review the O&M literature once for conformance to project requirements.
 - 3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Instruction:
 - 1. The Contractor will provide demonstration as required by the Contract Documents.
 - 2. A complete instruction plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any instruction.
 - 3. An instruction agenda for each instruction session must be submitted to the CxA one (1) week prior the instruction session.
 - 4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and the Commissioner. A copy of the test record shall be provided to the CxA and Commissioner.
 - 5. Engage a Factory-authorized service representative to instruct the City of New York's maintenance personnel to adjust, operate, and maintain specific equipment.
 - 6. Instruct the City of New York's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
 - 7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the CxA.
- B. Attend construction phase controls coordination meetings.
- C. Attend domestic water balancing review and coordination meetings.
- D. Participate in Plumbing systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.
- F. Include requirements for submittal data, operation and maintenance data, and instruction in each



- purchase order or sub-contract written.
- G. Prepare preliminary schedule for Plumbing system orientations and inspections, operation and maintenance manual submissions, instruction sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for the Commissioner. Distribute preliminary schedule to commissioning team members.
 - H. Update schedule as required throughout the construction period.
 - I. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for all commissioned equipment.
 - J. Assist the CxA in all verification and functional performance tests.
 - K. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
 - L. Gather operation and maintenance literature on all equipment and assemble in binders as required by the Contract Documents. Submit to CxA (45) days after submittal acceptance.
 - M. Coordinate with the CxA to provide (48) hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
 - N. Notify the CxA a minimum of (2) weeks in advance of the time for start of the balancing work. Attend the initial balancing meeting for review of the balancing procedures.
 - O. Participate in, and schedule vendors and subcontractors to participate in the instruction sessions.
 - P. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
 - 1. Plumbing equipment including backflow preventers, domestic water heaters, pumps, plumbing fixtures, and all other equipment furnished under Division 22.
 - 2. Gas piping, sanitary waste and vent piping, storm drainage piping, sump pumps and, sewage ejectors.
 - Q. The Contractor shall ensure the equipment suppliers shall document the performance of their equipment.
 - R. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.
 - S. The Contractor shall direct the TAB subcontractor to:
 - 1. Attend initial commissioning coordination meeting scheduled by the CxA.
 - 2. Submit the site specific balancing plan to the CxA and Commissioner for review and acceptance.
 - 3. Attend the balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in balancing the Plumbing system.
 - 4. Participate in verification of the balancing report, which will consist of repeating measurements contained in the balancing reports. Assist in diagnostic purposes when directed.
 - T. Provide instruction to the City of New York's maintenance personnel using expert qualified personnel, as specified.
 - U. The Contractor shall direct equipment suppliers to:
 - 1. Provide all requested submittal data, including detailed start-up procedures and specific



- requirements needed to keep warranties in force.
 - 2. Assist in equipment testing.
 - 3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- V. Refer to the DDC General Conditions for additional Contractor responsibilities.

3.3 CxA'S RESPONSIBILITIES

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the CxA that Plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the CxA that Plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify in writing that balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 DOMESTIC WATER BALANCING VERIFICATION

- A. Prior to performance of Domestic Water Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least ten (10) days in advance of testing and balancing work and provide access for the CxA to witness balancing work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of Plumbing systems at the direction of the CxA.
 - 1. The CxA will notify the Contractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. Use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final balancing report.
 - 4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.6 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of



the CxA.

- B. Scope of Plumbing testing shall include entire Plumbing installation. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The CxA along with the Contractor, Plumbing subcontractor and balancing subcontractor shall prepare detailed testing plans, procedures, and checklists for Plumbing systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible, as determined by the Commissioner.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.
- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 PLUMBING SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 22 sections. Provide submittals, test data, inspector record, and certifications to the CxA.
- B. Plumbing Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 22. Assist the CxA with preparation of testing plans.
- C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment: Test requirements are specified in Division 22 piping Sections. Plumbing subcontractor, under the direction of the Contractor, shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA.
- D. Plumbing Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, fuel gas, and sanitary waste and vent piping, storm drainage piping, sprinkler and domestic water distribution systems.
- E. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.
- F. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The systems shall be evaluated shall include, but not limited to:

1. One (1) Elevator Sump Pump
2. One (1) Electric Water Heater
3. One (1) Hot Water Circulating Pump
4. One (1) Expansion Tank
5. Domestic Water Pump Skid
6. Associated Plumbing Work

3.8 SEASONAL TESTING

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to seasonal testing.

3.9 OPERATION AND MAINTENANCE MANUALS

- A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems.”
- B. Refer to the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for the Commissioner and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.10 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

- A. Refer to the DDC General Conditions Section 01 79 00 “Demonstration and Owner’s Pre-Acceptance Orientation” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to instruction.
- B. The Contractor shall have the following instruction responsibilities:
 1. Provide the CxA with an instruction plan two weeks before the planned instruction.
 2. Provide comprehensive orientation and instruction in the understanding of the systems and the operation and maintenance of each piece of Plumbing equipment to the City of New York’s maintenance personnel.
 3. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 4. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing subcontractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment is required. More than one party may be required to execute the instruction.
 5. The instruction sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
 6. Hands-on instruction shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.
 7. Fully explain and demonstrate the operation, function and overrides of any local packaged controls.



8. Instruction shall occur after functional testing is complete, unless approved otherwise by the Commissioner.

END OF SECTION 22 08 00

SECTION 22 11 13

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.



2. Comply with NYC Plumbing Code, 2014 Edition for potable-water-service piping, including materials, installation, testing, and disinfection.
 3. Comply NYC Plumbing, 2014 Edition and NYC Fire Code, 2014 Edition for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- C. Piping materials must bear label, stamp, or other markings of specified testing agency.
 - D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
 - E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
 - F. NFPA Compliance: Comply with NFPA 24, 2007 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
 - G. Copper pipes and other materials used in Domestic Water system must be “Lead-Free” certified.
 - H. NSF Compliance:
 1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.
- 1.6 COORDINATION
- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Soft Copper Tube: “Lead-Free” certified, ASTM B 88, Type K (ASTM B 88M, Type A) and ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.
 1. Copper, Solder-Joint Fittings: “Lead-Free” certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- B. Hard Copper Tube: “Lead-Free” certified, ASTM B 88, Type K (ASTM B 88M, Type A) and ASTM B 88, Type L (ASTM B 88M, Type B), water tube, drawn temper.
 1. Copper, Solder-Joint Fittings: “Lead-Free” certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- C. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.



1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- D. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Gaskets: AWWA C111, rubber.
- E. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.
1. Grooved-End, Ductile-Iron Pipe Appurtenances:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Anvil International, Inc.
 - 2) Victaulic Company of America.
 - 3) U.S. Pipe and Foundry Company.
 - 4) Or Approved Equal.

2.2 JOINING MATERIALS

- A. Refer to Division 22 Section 220500 "Common Work Results for Plumbing" for commonly used joining materials.
- B. Brazing Filler Metals: AWS A5.8, BCuP Series.
- C. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.
- D. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.



- a. Standard: AWWA C219.

2.4 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American AVK Co.; Valves & Fittings Div.
 - b. American Cast Iron Pipe Co.; American Flow Control Div.
 - c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - d. Crane Co.; Crane Valve Group; Stockham Div.
 - e. East Jordan Iron Works, Inc.
 - f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
 - g. McWane, Inc.; Kennedy Valve Div.
 - h. McWane, Inc.; M & H Valve Company Div.
 - i. McWane, Inc.; Tyler Pipe Div.; Utilities Div.
 - j. Mueller Co.; Water Products Div.
 - k. NIBCO INC.
 - l. U.S. Pipe and Foundry Company.
 - m. Or Approved Equal.
2. Nonrising-Stem, Metal-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with cast-iron or bronze double-disc gate, bronze gate rings, bronze stem, and stem nut.
 - 1) Standard: AWWA C500.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
3. Nonrising-Stem, Resilient-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
4. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:
 - a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.



- 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 250 psig (1725 kPa).
 - 3) End Connections: Push on or mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
5. OS&Y, Rising-Stem, Metal-Seated Gate Valves:
- a. Description: Cast- or ductile-iron body and bonnet, with cast-iron double disc, bronze disc and seat rings, and bronze stem.
 - 1) Standard: AWWA C500.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Flanged.
6. OS&Y, Rising-Stem, Resilient-Seated Gate Valves:
- a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Flanged.
- B. UL/FMG, Cast-Iron Gate Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Co.; American Flow Control Div.
 - b. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - c. Crane Co.; Crane Valve Group; Stockham Div.
 - d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
 - e. McWane, Inc.; Kennedy Valve Div.
 - f. McWane, Inc.; M & H Valve Company Div.
 - g. Mueller Co.; Water Products Div.
 - h. NIBCO INC.
 - i. U.S. Pipe and Foundry Company.
 - j. Or Approved Equal.
 2. UL/FMG, Nonrising-Stem Gate Valves:
 - a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.



3. OS&Y, Rising-Stem Gate Valves:
 - a. Description: Iron body and bonnet and bronze seating material.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

C. Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Div.
 - d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
 - g. Red-White Valve Corporation.
 - h. Or Approved Equal.
2. OS&Y, Rising-Stem Gate Valves:
 - a. Description: Bronze body and bonnet and bronze stem.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Threaded.
3. Nonrising-Stem Gate Valves:
 - a. Description: Class 125, Type 1, bronze with solid wedge, threaded ends, and malleable iron handwheel.
 - 1) Standard: MSS SP-80.

2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - b. East Jordan Iron Works, Inc.
 - c. Flowserve.



- d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
 - e. McWane, Inc.; Kennedy Valve Div.
 - f. McWane, Inc.; M & H Valve Company Div.
 - g. Mueller Co.; Water Products Div.
 - h. U.S. Pipe and Foundry Company.
 - i. Or Approved Equal.
2. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.
 - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.
 - B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches (125 mm) in diameter.
 1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
 - C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.
- 2.6 CORPORATION VALVES AND CURB VALVES.
- A. Manufacturers:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amcast Industrial Corporation; Lee Brass Co.
 - b. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - c. Jones, James Company.
 - d. Master Meter, Inc.
 - e. McDonald, A. Y. Mfg. Co.
 - f. Mueller Co.; Water Products Div.
 - g. Red Head Manufacturing & Supply.
 - h. Or Approved Equal.
 - B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.



1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
 2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
 3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.
- C. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.
- D. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches (75 mm) in diameter.
1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

2.7 WATER METERS

- A. Water meters will be provided by Plumber.
- B. Manufacturers:
1. Basis-of-Design Product: Subject to compliance with NYC DEP requirements, provide NYC DEP water meter Elster (Amco) evoQ4 Electronic or a comparable product by one of the following:
 - a. AMCO Water Metering Systems.
 - b. Actaris
 - c. Metron-Farnier Spectrum
 - d. Or Approved Equal
- C. Single Jet or Electromagnetic Water Meters:
1. Description: With bronze main case.
 - a. Standard: AWWA C700.
 - b. Registration: Flow in gallons (liters) and cubic feet (cubic meters).
- D. Provide NYC DEP approved strainer.
- E. Provide meter with provision for AMR system and with remote reading device located on the exterior of the building. Remote reading pad location must be coordinated with Commissioner.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EARTHWORK

- A. Refer to Division 31 Section 312300 "Excavation and Fill" for excavating, trenching, and backfilling.

3.3 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 2 (DN 50) the following:
 - a. Hard Copper Tube: "Lead-Free" certified, ASTM B 88, Type K water tube, drawn temper.
 - b. Copper, Solder-Joint Fittings: "Lead-Free" certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- F. Above ground water-service piping NPS 2 (DN 50) the following:
 - b. Hard Copper Tube: "Lead-Free" certified, ASTM B 88, Type L water tube, drawn temper.
 - c. Copper, Solder-Joint Fittings: "Lead-Free" certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- G. Underground Fire-Service-Main Piping NPS 4 to NPS 8 (DN 100 to DN 200) any of the following:



1. Ductile-iron, lined, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.4 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 1. Underground Valves, NPS 3 (DN 80) and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.
 2. Underground Valves, NPS 4 (DN 100) and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
 3. Use the following for valves in vaults and aboveground:
 - a. Gate Valves, NPS 2 (DN 50) and Smaller: Bronze, rising stem.
 - b. Gate Valves, NPS 3 (DN 80) and Larger: AWWA, UL/FMG, cast iron, OS&Y rising stem.

3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. See Division 22 Section 220500 "Common Work Results for Plumbing" for piping-system common requirements.

3.6 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- C. Make connections larger than NPS 2 (DN 50) with tapping machine according to the following:
 1. Install tapping sleeve and tapping valve according to MSS SP-60.
 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.



- D. Make connections NPS 2 (DN 50) and smaller with drilling machine according to the following:
 - 1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 - 2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 - 3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 - 4. Install corporation valves into service-saddle assemblies.
 - 5. Install manifold for multiple taps in water main.
 - 6. Install curb valve in water-service piping with head pointing up and with service box.
- E. Comply with NFPA 24 for fire-service-main piping materials and installation.
 - 1. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- G. Install PE pipe according to ASTM D 2774 and ASTM F 645.
- H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- I. Bury piping with depth of cover over top at least 48 inches, below level of maximum frost penetration.
- J. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- K. Sleeves are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- L. Mechanical sleeve seals are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- M. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.7 JOINT CONSTRUCTION

- A. See Division 22 0500 Section 220500 "Common Work Results for Plumbing" for basic piping joint construction.
- B. Make pipe joints according to the following:



1. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
2. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
3. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
4. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
5. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
6. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 22 Section 220500 "Common Work Results for Plumbing" for joining piping of dissimilar metals.

3.8 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 1. Concrete thrust blocks.
 2. Locking mechanical joints.
 3. Set-screw mechanical retainer glands.
 4. Bolted flanged joints.
 5. Heat-fused joints.
 6. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 3. Fire-Service-Main Piping: According to NFPA 24, 2010 Edition.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.9 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. UL/FMG, Gate Valves: Comply with NFPA 24-2010. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- C. MSS Valves: Install as component of connected piping system.

- D. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.10 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.
- B. Water Meters: Include shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

3.11 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. See Division 22 Section 220500 "Common Work Results for Plumbing" for piping connections to valves and equipment.
- C. Connect water-distribution piping to utility water main. Use tapping sleeve and tapping valve or service clamp and corporation valve.
- D. Connect water-distribution piping to interior domestic water and fire-suppression piping.

3.12 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 - 1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

3.13 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section 312300 "Excavation and Fill".

- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 22 Section 220500 "Common Work Results for Plumbing" for identifying devices.

3.14 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or restored before use.
 - 2. Use purging and disinfecting procedure use procedure described in NFPA 24-2010 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 3. Use purging and disinfecting use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples for test to an inspection lab as directed by the Commissioner. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes domestic water piping inside the building.
- B. See Division 22 Section 221113 "Facility Water Distribution" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.
- C. See Division 22 Section 221119 "Domestic Water Piping Specialties" for water distribution piping specialties.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 "Quality Requirements".
- B. Comply with NSF 14, "Plastics Piping System Components and Related Materials," for plastic, potable domestic water piping and components.
- C. "LEAD-FREE" Certification: copper pipes and other materials used in domestic water cold and hot water systems must be "LEAD-FREE" certified.

- D. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- C. Soft Copper Tube: "LEAD-FREE" certified, ASTM B 88, Types K and L (ASTM B 88M, Types A and B), water tube, annealed temper.
 - 1. Copper Pressure Fittings: "LEAD-FREE" certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: "LEAD-FREE" certified, ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: "LEAD-FREE" certified, MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- D. Hard Copper Tube: "LEAD-FREE" certified, ASTM B 88, Types L and M (ASTM B 88M, Types B and C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: "LEAD-FREE" certified, ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: "LEAD-FREE" certified, ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: "LEAD-FREE" certified, MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 VALVES

- A. Bronze and cast-iron, general-duty valves are specified in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping."
- B. Balancing and drain valves are specified in Division 22 Section 221119 "Domestic Water Piping Specialties."

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXCAVATION

- A. Excavating, trenching, and backfilling are specified in Division 31 Section 312300 "Excavation and Fill".

3.3 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-Building-Slab, Water-Service Piping on Service Side of Water Meter: Refer to Division 22 Section 221113 "Facility Water Distribution Piping."
- E. Domestic Water Piping on Service Side of Water Meter inside the Building: Use the following piping materials for each size range:
 - 1. NPS 2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
- F. Under-Building-Slab, Domestic Water Piping on House Side of Water Meter, NPS 4 (DN 100) and Smaller: Hard copper tube, Type K; brazed joints.
- G. Aboveground Domestic Water Piping: Use any of the following piping materials for each size range:
 - 1. NPS 1 (DN 25) and Smaller: Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
 - 2. NPS 1-1/4 and NPS 1-1/2 (DN 32 and DN 40): Hard copper tube, Type L (Type B) copper pressure fittings; and soldered joints.
 - 3. NPS 2 (DN 50): Hard copper tube, Type L (Type B); copper pressure fittings; and brazed joints.

3.4 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 (DN 50) and smaller. Use cast-iron gate valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
 2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 (DN 50) and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
 3. Hot-Water-Piping, Balancing Duty: Memory-stop balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 (DN 50) and smaller. Use butterfly or gate valves for piping NPS 2-1/2 (DN 65) and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
1. Install hose-end drain valves at low points in water mains, risers, and branches.
 2. Install stop-and-waste drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 (DN 50) and smaller and butterfly valves for piping NPS 2-1/2 (DN 65) and larger. Balancing valves are specified in Division 22 Section 221119 "Domestic Water Piping Specialties."
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Division 22 Section 221119 "Domestic Water Piping Specialties."

3.5 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."
- C. Install cast-iron or steel sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section 220500 "Common Work Results for Plumbing."

- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Drain valves and strainers are specified in Division 22 Section 221119 "Domestic Water Piping Specialties."
- E. Install domestic water piping level without pitch and plumb.
- F. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

3.6 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- C. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

3.7 ROUGHING-IN FOR WATER METERS

- A. Rough-in domestic water piping for water meter installation according to utility company's requirements.

3.8 HANGER AND SUPPORT INSTALLATION

- A. Pipe hanger and support devices are specified in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m): MSS Type 49, spring cushion rolls, if indicated.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch (10 mm).
- E. Install supports for vertical steel piping every 15 feet (4.5 m).
- F. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 (DN 20) and Smaller: 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1 and NPS 1-1/4 (DN 25 and DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 4. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 - 5. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
- G. Install supports for vertical copper tubing every 10 feet (3 m).
- H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.9 CONNECTIONS

- A. Install piping adjacent to equipment and machines to allow service and maintenance.
- B. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- C. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
 - 1. Booster Pumps: Cold-water suction and discharge piping.
 - 2. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section 224000 "Plumbing Fixtures."
 - 4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 (DN 65) and larger.

3.10 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:



1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by Commissioner.
 2. During installation, notify Commissioner before inspection must be made. Perform tests specified below:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for Commissioner to observe tests specified below and to ensure compliance with requirements.
 3. Reinspection: If Commissioner finds that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 4. Reports: Prepare inspection reports and have them signed by Commissioner.
- B. Test domestic water piping as follows:
1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or restored leak free. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 4. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be restored.
 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping using purging and disinfecting procedures prescribed by NFPA 24, 2007.
- B. Submit water samples in sterile bottles to testing agency as determined by Commissioner. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.

END OF SECTION 221116

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SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following domestic water piping specialties:
1. Vacuum breakers.
 2. Backflow preventers.
 3. Balancing valves.
 4. Temperature-actuated water mixing valves.
 5. Hose bibbs.
 6. Wall hydrants.
 7. Hose Stations
 8. Drain valves.
 9. Water hammer arresters.
 10. Trap-seal primer valves.
- B. See Division 22 Section 221113 "Facility Water Distribution Piping" for water meters.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. NSF Compliance:
 - 1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
 - 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

1.6 LEAD-FREE” CERTIFICATION

- A. All products used in Domestic Water cold and hot water systems must be “LEAD-FREE” certified.

1.7 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig (860 kPa), unless otherwise indicated.

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

- A. Pipe-Applied, Pressure-Type, Spill-Resistant Vacuum Breakers:
 - 1. Basis-of- Design Product: Subject to compliance with requirements, provide vacuum breaker Watts Model LF008CQT-SC or comparable product by one of the following:
 - a. Ames Co.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. FEBCO; SPX Valves & Controls.
 - e. Zurn Plumbing Products Group; Wilkins Div.
 - f. Or Approved Equal.
 - 2. Standard: ASSE 1001.
 - 3. “LEAD-FREE” Certification: Required
 - 4. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
 - 5. Body: Bronze.
 - 6. Inlet and Outlet Connections: Threaded.
 - 7. Finish: Chrome plated.
- B. Hose-Connection Vacuum Breakers:



1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrowhead Brass Products, Inc.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. Legend Valve.
 - e. MIFAB, Inc.
 - f. Prier Products, Inc.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Woodford Manufacturing Company.
 - i. Zurn Plumbing Products Group; Light Commercial Operation.
 - j. Zurn Plumbing Products Group; Wilkins Div.
 - k. Or Approved Equal.
2. Standard: ASSE 1001.
3. “LEAD-FREE” Certification: Required
4. Body: Bronze, nonremovable, with manual drain.
5. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
6. Finish: Chrome or nickel plated.

2.2 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide “LEAD-FREE” certified, backflow preventer by Wilkins Model 975XL-MS with Flood Control System Zurn Model FCIS, which includes Solenoid Control Valve Zurn Model ZW206 and signal Relay Zurn Model EST or comparable product by one of the following:
 - a. Wilkins.
 - b. Febco.
 - c. AMES.
 - d. Or Approved Equal.
1. Standard: ASSE 1013.
2. “LEAD-FREE” Certification: Required
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 13 psig (83 kPa) maximum, through middle 1/3 of flow range.
5. Size: 1-1/2”.
6. Body: Bronze.
7. End Connections: Threaded.
8. Configuration: Designed for horizontal, straight through flow.
9. Accessories:
 - a. Valves: Outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.



- b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection, Model MG.
 - c. Integral Relief Valve Monitoring Switch with dry contact to transmit signal to remote location.
 - d. Alarm Signal must be transmitted to BMS.
10. Device must be installed as per NYC DEP Cross-Connection requirements and in compliance with approved application. Device must be provided with air gap fitting and integral Relief monitoring switch. All deviations from the approved application must be brought to the attention of Commissioner prior to the installation.

B. Double-Check Detector Backflow-Prevention Assemblies:

1. Basis-of-Design Product: Subject to compliance with requirements, provide “LEAD-FREE” certified, backflow preventer by Wilkins Model 350 DA or comparable product by one of the following:
 - a. Wilkins.
 - b. Febco.
 - c. AMES.
 - d. Or Approved Equal.
2. Standard: ASSE 1015.
3. “LEAD-FREE” Certification: Required
4. listing: UL Listed
5. Operation: Continuous-pressure applications, unless otherwise indicated.
6. Size: 3”.
7. Pressure Loss at Design Flow Rate: 8 psig.
8. Body: ductile iron with interior lining complying with AWWA C550 or that is FDA approved.
9. End Connections: Flanged for NPS 2-1/2 (DN 65) and larger.
10. Configuration: Designed for horizontal, straight through.
11. Accessories:
 - a. Valves: outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
 - b. NYC Approved 3/4” meter and RPZ on by-pass.
12. Device must be installed as per NYC DEP Cross-Connection requirements and in compliance with approved application. All deviations from the approved application must be brought to the attention of Commissioner prior to the installation.

C. Backflow-Preventer Test Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Wilkins.
 - b. Febco.

- c. AMES.
 - d. Approved Equal.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.3 BALANCING VALVES

A. Basis-of-Design Product: Subject to compliance with requirements, provide memory-stop balancing valves Watts Model LFCSM-61 or comparable product by one of the following:

1. Conbraco Industries, Inc.
2. Crane Co.; Crane Valve Group; Crane Valves.
3. Milwaukee Valve Company.
4. NIBCO INC.
5. Red-White Valve Corp.
6. Or Approved Equal.

B. Description:

1. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
2. “LEAD-FREE” Certification: Required
3. Pressure Rating: 400-psig (2760-kPa) minimum CWP.
4. Size: NPS 2 (DN 50) or smaller.
5. Body: Brass or Copper alloy.
6. Port: Standard or full port.
7. Ball: Chrome-plated brass.
8. Seats and Seals: Replaceable.
9. End Connections: Solder joint or threaded.
10. Handle: Vinyl-covered steel with memory-setting device.

2.4 TEMPERATURE-ACTUATED WATER MIXING VALVES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Thermostatic Mixing Valve, high-low Parallel Installation, with adjustable high temperature limit stop and inlet check stops, Leonard TM-26-LF or HOLBY Valve or comparable product by one of the following:

1. Armstrong International, Inc.
2. Leonard Valve Company.
3. Symmons Industries, Inc.
4. Approved Equal.

B. Description:

1. Standard: ASSE 1017.
2. “LEAD-FREE” Certification: Required
3. Pressure Rating: 125 psig (860 kPa).



4. Type: Exposed-mounting, thermostatically controlled water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Valve Pressure Rating: 125 psig (860 kPa) minimum, unless otherwise indicated.
9. Tempered-Water Setting: 90 deg F.
11. Tempered-Water Design Flow Rates: Varies.
12. Valve Finish: Rough bronze.
13. Piping Finish: Copper.

2.5 HOSE BIBB:

- A. Basic-of-Design Product: Subject to compliance with requirements, provide hose bibb Woodford Model 24 or comparable product by one of the following:

1. Leonard.
2. Armstrong.
3. Woodford.
4. Approved Equal.

B. Description:

1. Standard: ASSE 1011.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig (860 kPa).
7. Vacuum Breaker: Integral, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Wheel handle.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include wall flange with each chrome- or nickel-plated hose bibb.

2.6 WALL HYDRANTS

- A. Basic-of-Design Product: Subject to compliance with requirements, provide bronze nickel plated, quarter turn, non-freeze Wall Hydrants WH J.R. Smith Model 5609QT-WC or comparable product by one of the following:



1. Josam Company.
2. MIFAB, Inc.
3. Watts Drainage Products Inc.
4. Zurn Plumbing Products Group; Light Commercial Operation.
5. Zurn Plumbing Products Group; Specification Drainage Operation.
6. Approved Equal.

B. Description:

1. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
2. Pressure Rating: 125 psig (860 kPa).
3. Operation: Loose key.
4. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
5. Inlet: NPS 3/4 (DN 20).
6. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
7. Box: n/a
8. Backer Plate Finish: Chrome Plated.
9. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
10. Nozzle and Wall-Plate Finish: Nickel bronze.
11. Operating Keys(s): Two with each wall hydrant.
12. Vacuum breaker: Integrated

2.7 HOSE STATION and ACCESSORIES:

- A. Basic-of-Design Product:** Subject to compliance with requirements, provide Hose Station with hot and cold water inlets, thermostatic mixing valve, vacuum breaker, hose rack, hose connection, thermometer, wall support, heavy duty hose and hose nozzle, Leonard THS-25-VBD-CW or comparable product by one of the following:

1. Leonard.
2. Armstrong.
3. Woodford.
4. Approved Equal.

B. Description:

1. Pressure Rating: 125 psig (860 kPa).
2. Operation: Color coded heat resistant valves on inlets.
3. Inlets: NPS 3/4 (DN 20).
4. Box: n/a
5. Backer Plate Finish: Chrome Plated.
6. Thermostatic Mixing valve: thermostatic mixing valve and solid bimetal thermostat directly linked to valve porting.
7. Heat Resistant temperature adjusting lever.



8. Vacuum Breaker.
9. Outlet with dial thermometer (20 to 240 degree F)
10. Stainless steel hose rack.
11. 75 lf heavy duty ¾” flexible hose and hose nozzle.
12. Hose Rack: heavy-duty stainless steel hose rack.

2.8 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig (2760-kPa) minimum CWP.
3. Size: NPS 3/4 (DN 20).
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.9 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. PPP Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - f. Tyler Pipe; Wade Div.
 - g. Watts Drainage Products Inc.
 - h. Zurn Plumbing Products Group; Specification Drainage Operation.
 - i. Approved Equal.
2. Standard: ASSE 1010 or PDI-WH 201.
3. “LEAD-FREE” Certification: Required
4. Type: Copper tube with piston.
5. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.10 TRAP PRIMER

A. Trap primer for floor drains in finish areas:

1. Basis-of-design Product: Subject to compliance with requirements, provide trap primer J. R. Smith “Prime-Eze” or comparable product by one of the following:
 - a. PPP Inc.
 - b. Zurn.
 - c. Mifab.
 - d. Or Approved Equal.
- B. Trap primers in mechanical rooms:
 1. Basis-of-design Product: Subject to compliance with requirements, provide electronic trap primer PPP Model MPB-500-115V with distribution unit PPP series DU for four connections or comparable product by one of the following:
 - a. J.R.Smith.
 - b. Zurn
 - c. Mifab
 - d. Or Approved Equal.
- C. Trap primer must be installed in accordance with manufacturer’s recommendations.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Refer to Division 22 Section 220500 "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply requirements of NYC Department of Environmental Protection.
 1. Locate backflow preventers in same room as connected equipment or system.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 3. Do not install bypass piping around backflow preventers.
- C. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.

- D. Install balancing valves in locations where they can easily be adjusted.
- E. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 - 1. Install thermometers and water regulators if specified.
 - 2. Install cabinet-type units recessed in or surface mounted on wall as specified.
- F. Install water hammer arresters in water piping according to PDI-WH 201.
- G. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- H. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- I. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Intermediate atmospheric-vent backflow preventers.
 - 2. Reduced-pressure-principle backflow preventers.
 - 3. Double-check backflow-prevention assemblies.
 - 4. Water pressure-reducing valves.
 - 5. Primary, thermostatic, water mixing valves.
 - 6. Supply-type, trap-seal primer valves.
- J. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section 220553 "Identification for Plumbing Piping and Equipment."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
 - 1. Test each reduced-pressure-principle backflow preventer and double-check backflow-prevention assembly according to NYC DEP and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.4 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow of balancing valves.

- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION 221119

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SECTION 22 11 23.13

DOMESTIC-WATER - PACKAGED BOOSTER PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes variable speed, duplex, packaged booster pumps for domestic water piping systems.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each packaged booster pump specified. Include certified performance curves with operating points plotted on curves; and rated capacities of selected models, furnished specialties, and accessories.
- B. Shop Drawings: For packaged booster pumps and accessories. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: Detail power, signal, and control wiring.
- C. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100 and marked for intended use.

- C. Packaged booster pumps must be UL listed and labeled.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER BOOSTER SYSTEM

- A. Provide a unitary pre-packaged domestic Water Pressure Booster Pumping System per engineering data flow, and head requirements. The entire system must be listed under UL 2011, 38LW, “Packaged Pumping System” requirements.
- B. Pumps must be end suction or vertically mounted, close coupled, centrifugal, pumps, with carbon/ceramic mechanical seals.
- C. System must fit into 40”x30” footprint.
- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Aurora/Pentair Pump Group
 - 2. QuantumFlo, Inc.
 - 3. ITT/Bell & Gossett, Div.
 - 4. Or Approved equal.
- E. Motors must be; 3500 RPM, High Efficiency, Class F insulated, electric motors designed for inverter duty application. The motors must be suitable for the voltage, frequency, phasing and enclosure as indicated in the pump schedule on the project plan set.
- F. Pumps and Motors: Refer to plumbing drawings for additional information.
- G. Structural Elements: The entire system must be factory skid mounted on a minimum; 304 stainless-steel structural square tube support frame, with in-shear molded rubber vibration isolators.
- H. Valves: All valves must be full port bronze ball valves, with S.S. ball and stem design for valve sizes 2 1/2" and smaller, and cast iron, epoxy coated lever operated, grooved end type butterfly valves, with stainless steel disc, and Stainless Steel shaft, for valve sizes 3" and larger. Valves must be rated for maximum pressure service for the system.
- I. Control Panel: The pumping system control panel must incorporate the following elements, and criteria:
 - 1. The pump controller must be designed for total independent redundancy and properly sized for the maximum amperage draw of each motors full load current. Each pump must have mounted and wired an individual non-fused service disconnect switch, each disconnect must have a “home run” individual feeder fed from a 3-pole circuit breaker, with ground wire.



- Conductors and ground wire must be sized per NEC recommendations. Each Pump must have its own NEMA 1 rated variable speed drive with specially designed domestic water pump software. Each drive must utilize its own 4-20mA discharge transducer and have a separate suction switch which opens upon falling pressure of 5 psi and causes the controller to shut down after 10 seconds of the low suction condition. Each pump must return to normal running condition once the low suction condition is resolved without any human intervention. Should either 4-20ma discharge transducer fail an alarm condition should be signaled and the pump which lost its transducer must read the signal from the second pump. Should both transducers fail, both drives must Alarm.
2. The controller must be assembled with the ability to go into sleep mode when the desired set-point pressure has been met for any predetermined amount of time. It must resume running when system pressure has dropped 7 psi less than the desired set point. If pump 1 runs and has reached a speed of 55 Hz, the lag pump must receive a signal through the RS485 network signal cable that the lead pump requires the assistance of the lag, and the lag pump must follow the lead pump's speed until each pump has slowed to 40 Hz. At this point the lag pump will re-enter "sleep mode". This must continue for 24 hours of run time, after which the lead will become lag and lag must become lead, or "alternate". Should both pumps be called to run for a maximum speed of 60 hz for 4 minutes without reaching their setpoint, both drives will assume a pipe has broken and shutdown, while sending an alarm signal as such.
 3. Control panels which require control circuit transformers (CCT's), Programmable Logic Controllers (PLS's) Programmable relays, non-programmable relays, timers, must not be considered equal, and have been rendered obsolete.
 - a. All components must be of standard manufacture, and not be of proprietary sole source.
 - J. Pump Sequencing: All pump sequencing must be initiated and controlled via the 4-20mA transducer. Upon pressure drop the lead pump must initiate via VFD and run to attempt to satisfy demand. The lag pump staging must be initiated by the previously called VFD when it reaches 55 Hz. In the event the pressure set point is not satisfied after a variable time delay, the lag pump must initiate to assist the lead pump in meeting demand regardless of the previously running drive call setting. After the pressure set point is reached, the pumps must continue to run for a variable off delay period to allow for motor winding "cool down", and to prevent short cycling of the pumps. After all pressures have been satisfied, and all functions have timed out, the system must revert to the stand-by mode.
 - K. Pump Thermal Relief: Provide secondary, emergency, non-electric, thermal, relief valve to prevent pumps from overheating due to dead heading condition. The protective device must relieve at 145 degrees F.
 - L. Bladder Tank: No bladder tank is recommended, or required for this type system.
 - M. Pressure Regulation: Pressure regulation is provided via the variable frequency drive controllers, with PID control. No other pressure regulators are required. In the event of any drive failure, next drive in sequence must start automatically and the failed drive must indicate a fault condition. In



the event of a loss of transducer signal, the system must maintain the last pressure setting as loaded into the VFD and maintain positive pressure on the system via the hand operator. There will be no failure of the major control components which will compromise the building pipe pressure ratings.

N. Fabrication:

1. All headers, nipples, and welded attachments to the headers must be type 304 stainless steel materials.
2. All welding must be in accordance with section IX of the ASME Boiler and Pressure Vessel code, and must be performed by welders qualified under that standard
3. The completed system must be hydrostatically tested after all appurtenances have been installed to a minimum of 1.5 times the specified system working pressure.

O. Each pump must have an individual resilient seated non-slam type check valve on each pump immediately downstream of the pump discharge.

P. All pumps must be mounted utilizing in-shear rubber vibration isolators mounted to the motor bases.

Q. All stainless-steel surfaces must be brushed or polished.

R. Start-up:

1. Initial factory start-up and instruction must be performed by a qualified factory technician. A factory certified start-up report must be provided to the Commissioner dated and signed by the factory technician.

S. Parts: A complete listing of all parts and equipment for the system must be listed using the original manufacturer's model, and serial numbers, and source information.

T. City of New York Personnel Instruction: The instruction must include, but not be limited to the following:

1. Instruction in the replacement of the motor, mechanical seals and pump impeller.
2. Safe replacement of the Control Module EEPROM chip, fuses, and pilot lamps.
3. Proper operation of the system, troubleshooting, alarm, and reset features

U. Manufacturer's Warranty: Provide 1-year warranty for package and its components. Warranty will be performed by the manufacturer or a factory representative.

PART 3 - EXECUTION

3.1 EXECUTIVE REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 CONCRETE BASES

- A. Install concrete bases of dimensions indicated for packaged booster pumps. Refer to Division 22 Section 220500 "Common Work Results for Plumbing."
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be imbedded.
 - 4. Install anchor bolts to elevation required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 BOOSTER PUMP INSTALLATION

- A. Install packaged booster pumps level on concrete bases with access for periodic maintenance including removal of pumps, motors, impellers, couplings, and accessories.
 - 1. Do not dismantle packaged booster pumps or remove individual components.
- B. Vibration Isolation: Install on spring isolators with minimum deflection of 0.75”.
- C. Support connected domestic water piping, so weight of piping is not supported by packaged booster pumps.
- D. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- E. Connect domestic water piping to packaged booster pumps. Install suction and discharge pipe equal to or greater than size of unit suction and discharge headers.
 - 1. Install shutoff valves on piping connections to each booster pump suction and discharge piping. Install ball, butterfly, or gate valves same size as suction and discharge headers. General-duty valves are specified in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping."



2. Install union or flanged connections on pump suction and discharge headers at connection to domestic water piping.
 3. Install piping adjacent to packaged booster pumps to allow service and maintenance.
- F. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems".
- G. Connect wiring according to Division 26 Section 220519 "Low-Voltage Electrical Power Conductors and Cables."
- H. Install identifying equipment markers and equipment signs on booster pumps. Labeling and identification materials are specified in Division 22 Section 220529 "Identification for Plumbing Piping and Equipment."

3.4 DEMONSTRATION

- A. Engage a factory service representative to instruct City of New York's maintenance personnel to adjust, operate, and maintain packaged booster pumps. Also refer to DDC General Conditions.

END OF SECTION 221123

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes the following soil and waste, sanitary drainage, and vent piping inside the building:
1. Pipe, tube, and fittings.
 2. Special pipe fittings.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 "Submittal Procedures".

1.4 SUBMITTALS

- A. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 "Quality Requirements".
- B. Piping materials must bear label, stamp, or other markings of specified testing agency.
- C. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; and "NSF-drain" for plastic drain piping.

1.6 PERFORMANCE REQUIREMENTS

- A. Components and installation must be capable of withstanding the following minimum working pressure, unless otherwise indicated:



1. Soil, Waste, and Vent Piping: 10-foot head of water.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Hub-and-Spigot, Cast-Iron Pipe and Fittings: ASTM A 74, Extra Heavy Class.
 1. Gaskets: ASTM C 564, rubber.
- B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
 1. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
 2. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - a. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
- C. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.
 1. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.
 2. Pressure Fittings:
 - a. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 - b. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
 - c. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
 - d. Cast-Iron Flanges: ASME B16.1, Class 125.
 - e. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 PIPING APPLICATIONS

- A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, soil, waste, and vent piping, except house drains in cellar (from bottom of risers to house trap) must be:
 - 1. Hubless cast-iron soil pipe and fittings; standard, stainless-steel couplings; and hubless-coupling joints.
- D. Underground, soil, waste and vent piping must be:
 - 1. Extra heavy class, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints
- E. Aboveground house drains in cellar (from bottom of risers to house trap) must be:
 - 1. Service weight, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints.
- F. All exposed sanitary and vent pipes must be provided with PVC Jacketing.

3.3 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building is specified in Division 33 Section 334211 "Stormwater Gravity Piping".
- B. Basic piping installation requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- E. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section 220500 "Common Work Results for Plumbing."



- F. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- G. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- H. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- I. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
 - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- K. Do not enclose, cover, or put piping into operation until it is inspected and approved by NYC DOB.
- L. Properly restrain sanitary and vent pipes at the bottom of each riser

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - 1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
 - 2. Hubless Joints: Make with rubber gasket and sleeve or clamp.



- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- D. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

- A. General-duty valves are specified in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping."
- B. Shutoff Valves: Install shutoff valve on each sewage pump discharge.
 - 1. Use gate or full-port ball valve for piping NPS 2 (DN 50) and smaller.
 - 2. Use gate valve for piping NPS 2-1/2 (DN 65) and larger.
- C. Check Valves: Install swing check valve, downstream from shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.
 - 4. Backwater valves are specified in Division 22 Section 221319 "Sanitary Waste Piping Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, through deck steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."



- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 - 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 - 5. Spacing for 10-foot (3-m) lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).
- F. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
- G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1-1/2 (DN 40): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 2 (DN 50): 10 feet (3 m) with 3/8-inch (10-mm) rod.
 - 4. NPS 2-1/2 (DN 65): 11 feet (3.4 m) with 1/2-inch (13-mm) rod.
 - 5. NPS 3 (DN 80): 12 feet (3.7 m) with 1/2-inch (13-mm) rod.
 - 6. NPS 4 and NPS 5 (DN 100 and DN 125): 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
 - 7. NPS 6 (DN 150): 12 feet (3.7 m) with 3/4-inch (19-mm) rod.
- H. Install supports for vertical steel piping every 15 feet (4.5 m).
- I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 - 4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 - 5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
- J. Install supports for vertical copper tubing every 10 feet (3 m).
- K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.



3.7 CONNECTIONS

- A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- B. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section 221319 "Sanitary Waste Piping Specialties."
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section 221319 "Sanitary Waste Piping Specialties."
 - 4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

3.8 FIELD QUALITY CONTROL

- A. During installation, notify Commissioner at least 24 hours before inspection must be made. Perform tests specified below in presence of Commissioner.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by Commissioner to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If Commissioner finds that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by Commissioner.
- D. Test sanitary drainage and vent piping.
 - 1. Fix leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 2. Prepare reports for tests and required corrective action.

3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.



- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 22 13 19

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following sanitary drainage piping specialties:

1. Cleanouts.
2. Floor drains.
3. Trench Drain (in Locker Rooms)
4. Standpipe.
5. Roof flashing assemblies.
6. Miscellaneous sanitary drainage piping specialties.
7. Flashing materials.
8. Backwater valves.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Trench Drainage System: Provide shop drawings showing trench layout with all dimensions and components and submittals for all components.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Drainage piping specialties must bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Cast-Iron Cleanouts:

1. Manufacturers:

- a. Josam Company; Josam Div.
- b. MIFAB, Inc.
- c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- d. Tyler Pipe; Wade Div.
- e. Watts Drainage Products Inc.
- f. Zurn Plumbing Products Group; Specification Drainage Operation.
- g. Approved Equal.

2. Standard: ASME A112.36.2M.

3. Size: Same as connected drainage piping

4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.

5. Closure: brass plug.

6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Floor Cleanouts:

1. Manufacturers:

- a. Josam Company; Josam Div.
- b. Oatey.
- c. Sioux Chief Manufacturing Company, Inc.
- d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- e. Tyler Pipe; Wade Div.
- f. Watts Drainage Products Inc.
- g. Zurn Plumbing Products Group; Light Commercial Operation.
- h. Zurn Plumbing Products Group; Specification Drainage Operation.
- i. Approved Equal.

2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.

3. Size: Same as connected branch.

4. Type: Threaded, adjustable housing.

5. Body or Ferrule: Ductile iron.

6. Clamping Device: Not required.

7. Outlet Connection: Inside calk.



8. Closure: Brass plug with tapered threads.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Nickel-bronze.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. Or Approved Equal.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: drilled-and-threaded brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, stainless steel cover plate with screw.

2.2 FLOOR DRAINS FD-1

A. Basis-of-Design Product: Subject to compliance with requirements, provide floor Drains FD-1 in showers, bathrooms and other finish areas, cast iron with flashing collar and adjustable strainer head, trap primer connection, J.R.Smith Model 2005-A-075 or comparable product by one of the following:

1. Commercial Enameling Co.
2. Josam Company; Josam Div.
3. MIFAB, Inc.
4. Prier Products, Inc.
5. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
6. Tyler Pipe; Wade Div.
7. Watts Drainage Products Inc.
8. Zurn Plumbing Products Group; Light Commercial Operation.
9. Zurn Plumbing Products Group; Specification Drainage Operation.
10. Or Approved Equal.

B. Description:



1. Standard: ASME A112.6.3.
2. Pattern: Floor drain.
3. Body Material: Duco cast iron.
4. Seepage Flange: Required.
5. Anchor Flange: Required.
6. Clamping Device: Required.
7. Outlet: Bottom.
8. Backwater Valve: Not required.
9. Coating on Interior and Exposed Exterior Surfaces: Not required.
10. Sediment Bucket: Not required.
11. Top or Strainer Material: Nickel bronze.
12. Top of Body and Strainer Finish: Nickel bronze.
13. Top Shape: Round.
14. Dimensions of Top or Strainer: 5”.
15. Top Loading Classification: Light Duty.
16. Funnel: Required where shown on contract drawings.
17. Inlet Fitting: Not required.
18. Trap Material: Cast iron.
19. Trap Pattern: P-trap.
20. Trap Priming: Required.

2.3 FLOOR DRAINS FD-2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide medium duty cast iron with flashing clamp, adjustable cast iron tractor nickel bronze top grate, “safe-set” sediment bucket and trap primer Floor Drains FD-2 in Utility Room and other similar areas, J.R. Smith Model 2360-P075- U-NB or comparable product by one of the following:

1. Commercial Enameling Co.
2. Josam Company; Josam Div.
3. MIFAB, Inc.
4. Prier Products, Inc.
5. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
6. Tyler Pipe; Wade Div.
7. Watts Drainage Products Inc.
8. Zurn Plumbing Products Group; Light Commercial Operation.
9. Zurn Plumbing Products Group; Specification Drainage Operation.
10. Approved Equal.

B. Description:

1. Standard: ASME A112.6.3.
2. Pattern: Floor drain.
3. Body Material: Duco cast iron.
4. Seepage Flange: Required.
5. Anchor Flange: Required.



6. Clamping Device: Required.
7. Outlet: Bottom.
8. Backwater Valve: Not required.
9. Coating on Interior and Exposed Exterior Surfaces: Not required.
10. Sediment Bucket: Required.
11. Top or Strainer Material: Nickel bronze.
12. Top of Body and Strainer Finish: Nickel bronze.
13. Top Shape: Round.
14. Dimensions of Top or Strainer: 12”.
15. Top Loading Classification: Medium Duty.
16. Funnel: Required where shown on contract drawings.
17. Inlet Fitting: Not required.
18. Trap Material: Cast iron.
19. Trap Pattern: P-trap.
20. Trap Priming: Required where shown on drawings.

2.4 TRENCH DRAINS (in LOCKER ROOMS)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide trench drains TD in locker rooms 316 stainless steel with vandal proof ADA compliant perforated inlay grating, flashing flange and clamp and 2” bottom outlet, J.R.Smith Model 9666-FS-316 or comparable product by one of the following:

1. Zurn
2. TDS
3. MIFAB, Inc.
4. Approved Equal.

2.5 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Open Drains (standpipe):

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, 18” long hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping.

- B. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.

- C. Air-Gap Fittings:



1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

D. Funnel Drain:

1. Basis-of-Design Product: Subject to compliance with requirements, provide duco cast iron funnel drain with acid resistant coated interior and exterior with no-hub adaptor, 4” outlet, J.R.Smith Figure 3821 or comparable product by one of the following:
 - a. Zurn.
 - b. Wade.
 - c. MIFAB, Inc.
 - d. Or Approved Equal.

2.6 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 1. General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
 2. Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
 3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.
- B. Fasteners: Metal compatible with material and substrate being fastened.
- C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- D. Solder: ASTM B 32, lead-free alloy.
- E. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.7 BACKWATER VALVE

- A. Horizontal, Cast-Iron Backwater Valves:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide backwater valve Model 7012 manufactured by J.R.Smith or a comparable product by one of the following:



- a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. Approved Equal.
2. Standard: ASME A112.14.1.
 3. Size: Same as connected piping.
 4. Body: Cast iron.
 5. Cover: Cast iron with threaded access check valve.
 6. End Connections: Hub and Spigot.
 7. Type Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang ¼" open for airflow unless subject to backflow condition.
 8. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Refer to Division 22 Section 220500 "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
 4. Locate at base of each vertical soil and waste stack.

- D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- F. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
 - b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
 - c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- G. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- H. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- I. Assemble open drain fittings and install with top of hub 2 inches (51 mm) above floor.
- J. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- K. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.
- L. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- M. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- N. Install vent caps on each vent pipe passing through roof.

- O. Install grease interceptors, including trapping, venting, and flow-control fitting, with clear space for servicing.
 - 1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
 - 2. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor.
 - 3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
 - 4. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.
- P. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- Q. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.4 FLASHING INSTALLATION

- A. Coordinate this article with Division 05 Section 055000 "Metal Fabrications."
- B. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.
- C. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 2. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 - 3. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.

4. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
 - D. Set flashing on floors and roofs in solid coating of bituminous cement.
 - E. Secure flashing into sleeve and specialty clamping ring or device.
 - F. Retain one or both paragraphs below.
 - G. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 05 Section 055000 "Metal Fabrications."
 - H. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.5 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each grease interceptor.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section 220553 "Identification for Plumbing Piping and Equipment."

3.6 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 14 13

FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following storm drainage piping inside the building.
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Piping materials must bear label, stamp, or other markings of specified testing agency.

1.6 PERFORMANCE REQUIREMENTS

- A. Components and installation must be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Storm Drainage Piping: 10-foot head of water.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Hub-and-Spigot, Cast-Iron Pipe and Fittings: ASTM A 74, Extra heavy class.
 - 1. Gaskets: ASTM C 564, rubber.
- B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
 - 1. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - a. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
- C. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.
 - 1. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING APPLICATIONS

- A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Underground storm drainage piping must be:
 - 1. Extra heavy, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
- C. Sump pump discharge:
 - 1. Galvanized steel pipe, Schedule 40, drainage fittings, and threaded joints.



3.3 PIPING INSTALLATION

- A. Storm sewer and drainage piping outside the building are specified in Division 33 Section 334211 "Stormwater Gravity Piping".
- B. Basic piping installation requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- C. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers. Cleanouts are specified in Division 22 Section 221423 "Storm Drainage Piping Specialties."
- D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- E. Install wall-penetration-fitting system at each service pipe penetration through foundation wall. Make installation watertight.
- F. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- G. Make changes in direction for storm piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- H. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- I. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:
 - 1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
 - 2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.
- J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- K. Do not enclose, cover, or put piping into operation until it is inspected and approved by NYC DOB.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- B. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Hubless Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

3.5 VALVE INSTALLATION

- A. Backwater Valves: Install backwater valves in piping subject to backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Install backwater valves in accessible locations.
 - 3. Backwater valve are specified in Division 22 Section 221423 "Storm Drainage Piping Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.



- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 5. Spacing for 10-foot (3-m) lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).
- F. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
- G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/4 (DN 32): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 2. NPS 1-1/2 (DN 40): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 3. NPS 2 (DN 50): 10 feet (3 m) with 3/8-inch (10-mm) rod.
 4. NPS 2-1/2 (DN 65): 11 feet (3.4 m) with 1/2-inch (13-mm) rod.
 5. NPS 3 (DN 80): 12 feet (3.7 m) with 1/2-inch (13-mm) rod.
 6. NPS 4 and NPS 5 (DN 100 and DN 125): 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
 7. NPS 6 (DN 150): 12 feet (3.7 m) with 3/4-inch (19-mm) rod.
- H. Install supports for vertical steel piping every 15 feet (4.5 m).
- I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
- J. Install supports for vertical copper tubing every 10 feet (3 m).
- K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

- B. Connect storm drainage piping to roof drains and storm drainage specialties.

3.8 FIELD QUALITY CONTROL

- A. During installation, notify Commissioner at least 24 hours before inspection must be made. Perform tests specified below in presence of Commissioner.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
 - 2. Final Inspection: Arrange for final inspection by Commissioner to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If Commissioner finds that piping will not pass test or inspection, make required corrections, and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by the Commissioner.
- D. Test storm drainage piping according to procedures of NYC Plumbing Code, 2014.

3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221413

SECTION 22 14 23

STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes the following storm drainage piping specialties:

1. Cleanouts.
2. Backwater valve.
3. Trench Drain.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Storm drainage piping specialties must bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. Approved Equal.
2. Standard: ASME A112.36.2M for cast iron.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head, brass plug.
6. Closure Plug Size: Same as cleanout size.

B. Cast-Iron Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Oatey.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Light Commercial Operation.
 - h. Zurn Plumbing Products Group; Specification Drainage Operation.
 - i. Approved Equal.
2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Threaded, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Required for membrane floors only.
7. Outlet Connection: Inside calk.
8. Closure: Brass plug with straight threads and gasket.

9. Adjustable Housing Material: nickel bronze with threads.
10. Frame and Cover Material and Finish: Nickel-bronze.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Extra-Heavyclass, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. Approved Equal.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head, drilled-and-threaded brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, stainless-steel cover plate with screw.

2.2 BACKWATER VALVE

A. Horizontal, Cast-Iron Backwater Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide backwater valve Model 7012 manufactured by J.R.Smith or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. Approved Equal.
2. Standard: ASME A112.14.1.
3. Size: Same as connected piping.
4. Body: Cast iron.

5. Cover: Cast iron with threaded access check valve.
6. End Connections: Hub and Spigot.
7. Type Check Valve: Removable, bronze, swing check, factory assembled, or field modified to hang ¼” open for airflow unless subject to backflow condition.
8. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

2.3 GARAGE TRENCH DRAINAGE SYSTEM:

- A. Basis-of-Design Product: Subject to compliance with requirements, provide drainage system J.R. SMITH ACO drain, extra heavy-duty DIN 19580 Class E, Model 9812, completed with secured longitudinal ADA compliant ductile iron gratings J.R. Smith ACO Model 9812-MADA or comparable product by one of the following:
 1. Zurn.
 2. J. R. Smith.
 3. MIFAB.
 4. Approved Equal.
- B. The trench system bodies must be manufactured from polymer concrete with minimum properties as follows:
 1. Compressive strength- 32, 000 psi
 2. Flexural strength – 24,000 psi
 3. Water absorption – 0.15%
 4. Frost Proof – yes
 5. Salt Proof – yes
 6. Dilute acid and alkali resistant – yes
- C. The normal clear opening must be 8” with overall width of 10.1”. Pre-cast units must be manufactured with invert slope of 1.05% and have a wall thickness of at least 0.67”. Each unit must feature a partial radius in the trench bottom and a male to female interconnecting end profile. Units must have horizontal cast in anchoring keys on the outside walls to ensure maximum mechanical bond to the surrounding bedding material and pavement surface. The ductile iron edge rail will be integrally cast in by the manufacturer to ensure maximum homogeneity between polymer concrete body and edge rail. Each edge rail must be at least ¼” thick.
- D. Grates must be longitudinal ductile iron. After removal of grades there must be uninterrupted access to the trench to aid maintenance.
- E. At the point of connection to the drainage system, trench must be provided with in-line catch basin and foul air trap.
- F. Trench length must be coordinated with architectural drawings.
- G. Trench System must be installed in accordance with the manufacturer’s installation instructions and recommendations.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Refer to Division 22 Section 225000 "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- E. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions. Roof materials are specified in Division 07.
1. Install roof-drain flashing collar or flange so that there will be no leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 2. Position roof drains for easy access and maintenance.
- F. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- G. Install cast-iron soil pipe downspout boots at grade with top of hub 18 inches above grade.
- H. Install conductor nozzles at exposed bottom of conductors where they spill onto grade.
- I. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

3.4 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221423

SECTION 221429

SUMP PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes submersible sump pumps and accessories, inside the building, for building storm drainage systems.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type and size of sump pump specified. Include certified performance curves with operating points plotted on curves, and rated capacities of selected models, furnished specialties, and accessories.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100, by a testing agency and marked for intended use.

PART 2 - PRODUCTS

2.1 SUBMERSIBLE SUMP PUMP SP-1:

- A. Basis-of-Design Product: Subject to compliance with requirements, provide sump pump manufactured by Stancor Model O/M SE-50 ELV or comparable product by one of the following:
1. Federal Pump
 2. Goulds Pumps; ITT Industries.
 3. Weil Pump Company, Inc.
 4. Or Approved Equal.
- B. Description: Factory-assembled and -tested, simplex, single-stage, submersible, direct-connected sump pumps complying with UL 778 and HI 1.1-1.2 and HI 1.3 for submersible sump pumps.
- C. Casing: Cast iron; with cast-iron inlet strainer, legs that elevate pump to permit flow into impeller, and vertical discharge with companion flange for piping connection.
- D. Casing and Impeller: Stainless steel casing with inlet strainer and stainless steel impeller locked firmly to the motor shaft.
- E. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings.
- F. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection; three-conductor waterproof power cable of length required, and with grounding plug and cable-sealing assembly for connection at pump. Pump Discharge Piping: Field fabricated ASTM A 53 /A 53 M, Schedule 40, galvanized-steel pipe.
- G. Pit Cover: Slotted steel with bituminous coating and strong enough to support controls.
- H. Controls: NEMA 250, Type 4 enclosure, with 8-pin twist lock receptacle, dual solid state Oil-Minder relays with variable sensitivity settings, over current relay, self-cleaning stainless steel sensor probe, warning horn with alarm silencing switch, dual floats, clearly marked terminal board and remote monitoring contact.
- I. Controls: submersible float switch for automatic control of the pump mount to pump discharge pipe, submersible float switch for HWA, oil probe cable.
- J. General Trouble Alarm must be connected to BMS or Security system.

2.2 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Anamet, Inc.
 2. Flex-Hose Co., Inc.
 3. Flexicraft Industries.
 4. Flex-Pression, Ltd.
 5. Flex-Weld, Inc.
 6. Hyspan Precision Products, Inc.
 7. Mercer Rubber.
 8. Metraflex, Inc.
 9. Proco Products, Inc.
 10. Tozen America Corporation.
 11. Or Approved Equal.
- B. Description: 125-psig (860-kPa) minimum working-pressure rating and ends matching pump connection:
1. Bronze Flexible Connectors: Corrugated, bronze inner tubing covered with bronze wire braid. Include copper-tube ends or bronze flanged ends, braze welded to tubing.
 2. Stainless-Steel Flexible Connectors: Corrugated, stainless-steel inner tubing covered with stainless-steel wire braid. Include stainless-steel nipples or flanges, welded to tubing.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 SUMP PUMP INSTALLATION

- A. Excavating, trenching, and backfilling are specified in Division 312300 “Excavation and Fill”.
- B. Install sump pumps according to applicable requirements in HI 1.4.
- C. Install pumps and arrange to provide access for maintenance including removal of motors, impellers, couplings, and accessories.
- D. Set submersible sump pumps on pit floor. Make direct connections to storm drainage piping.
- E. Install sump pump basins and connect to drainage piping. Brace interior of basins according to manufacturer's written instructions to prevent distortion or collapse during concrete placement.



Set basin cover and fasten to basin top flange. Install cover so top surface is flush with finished floor.

- F. Construct sump pump pits and connect to drainage piping. Set pit curb frame recessed in and anchored to concrete. Fasten pit cover to pit curb flange. Install cover so top surface is flush with finished floor.
- G. Support piping so weight of piping is not supported by pumps.
- H. Piping installation requirements are specified in Division 22 Section 221413 "Facility Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- I. Install piping adjacent to sump pumps to allow service and maintenance.
- J. Install discharge piping equal to or greater than size of pump discharge piping. Refer to Division 22 Section 221413 "Facility Storm Drainage Piping."
 - 1. Install flexible connectors adjacent to pumps in discharge piping.
 - 2. Install check and shutoff valves on discharge piping from each pump. Install unions on pumps having threaded pipe connections. Install valves same size as connected piping.
- K. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."
- L. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- M. Refer to Division 22 Section 220523 "General-Duty Valves for Plumbing Piping" for general-duty valves for drainage piping.

END OF SECTION 221429

SECTION 221513

GENERAL-SERVICE COMPRESSED-AIR PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes piping and related specialties for general-service compressed-air systems operating at 200 psig (1380 kPa) or less.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data for the following:
 - 1. Pipes, fittings, and valves.
 - 2. Dielectric fittings.
 - 3. Flexible pipe connectors.
 - 4. Safety valves.
 - 5. Pressure regulators. Include rated capacities and operating characteristics.
 - 6. Automatic drain valves.
 - 7. Filters. Include rated capacities and operating characteristics.
 - 8. Lubricators. Include rated capacities and operating characteristics.
 - 9. Quick couplings.
 - 10. Retractable Hose Reels.
- B. Brazing and welding certificates.

- C. Qualification Data: For Installers.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For general-service compressed-air piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Installer Qualifications:
 - 1. Extruded-Tee Outlet Procedure: Qualify operators according to instruction provided by manufacturer, for making branch outlets.
 - 2. Pressure-Seal Joining Procedure for Copper Tubing: Qualify operators according to instruction provided by manufacturer.
 - 3. Pressure-Seal Joining Procedure for Steel Piping. Qualify operators according to instruction provided by manufacturer.
- C. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications," or to AWS B2.2, "Standard for Brazing Procedure and Performance Qualification."
- D. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- E. ASME Compliance:
 - 1. Comply with ASME B31.1, "Power Piping," for high-pressure compressed-air piping.
 - 2. Comply with ASME B31.9, "Building Services Piping," for low-pressure compressed-air piping.

1.6 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. CR: Chlorosulfonated polyethylene synthetic rubber.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.

- D. HDPE: High-density polyethylene plastic.
- E. NBR: Acrylonitrile-butadiene rubber.
- F. PE: Polyethylene plastic.
- G. PVC: Polyvinyl chloride plastic.
- H. High-Pressure Compressed-Air Piping: System of compressed-air piping and specialties operating at pressures between 150 and 200 psig (1035 and 1380 kPa).
- I. Low-Pressure Compressed-Air Piping: System of compressed-air piping and specialties operating at pressures of 150 psig (1035 kPa) or less.

1.7 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Compressed-air piping and support and installation must withstand effects of seismic events determined according to SEI/ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

- A. Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) seamless, drawn-temper, water tube.
 - 1. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, wrought copper with dimensions for brazed joints.
 - 2. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300.
 - 3. Copper Unions: ASME B16.22 or MSS SP-123.
 - 4. Press-Type Fittings, NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
- B. Transition Couplings for Metal Piping: Metal coupling or other manufactured fitting same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.2 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for compressed-air piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. PVC Piping: ASTM D 2564. Include primer complying with ASTM F 656.

2.3 VALVES

- A. Metal Ball, Butterfly, Check, Gate, and Globe Valves: Comply with requirements in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping."

2.4 DIELECTRIC FITTINGS

- A. General Requirements for Dielectric Fittings: Combination fitting of copper alloy and ferrous materials with insulating material; suitable for system fluid, pressure, and temperature. Include threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.



- B. Dielectric Unions: Factory-fabricated union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. EPCO Sales, Inc.
 - d. Hart Industries International, Inc.
 - e. Watts Water Technologies, Inc.; Water Products Div.
 - f. Zurn Plumbing Products Group; Wilkins Div.
 - g. Or Approved Equal.
- C. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. EPCO Sales, Inc.
 - d. Watts Water Technologies, Inc.; Water Products Div.
 - e. Or Approved Equal.
- D. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers. Separate companion flanges and steel bolts and nuts must have 150- or 300-psig (1035- or 2070-kPa) minimum working pressure where required to suit system pressures.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - e. Or Approved Equal.

2.5 FLEXIBLE PIPE CONNECTORS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Flex-Hose Co., Inc.
 2. Flexicraft Industries.
 3. Hyspan Precision Products, Inc.
 4. Mercer Rubber Co.
 5. Metraflex, Inc.
 6. Proco Products, Inc.
 7. Unaflex, Inc.
 8. Universal Metal Hose; a Hyspan Company
 9. Or Approved Equal.
- B. **Bronze-Hose Flexible Pipe Connectors:** Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
1. Working-Pressure Rating: 250 psig (1725 kPa) minimum.
 2. End Connections, NPS 2 (DN 50) and Smaller: Threaded copper pipe or plain-end copper tube.
 3. End Connections, NPS 2-1/2 (DN 65) and Larger: Flanged copper alloy.

2.6 SLEEVES

- A. **Galvanized-Steel Sheet:** 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. **Stack Sleeve Fittings:** Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.

2.7 ESCUTCHEONS

- A. **General Requirements:** Manufactured wall and ceiling escutcheons and floor plates, with ID to closely fit around pipe and tube and OD that completely covers opening.
- B. **One-Piece, Deep-Pattern Escutcheons:** Deep-drawn, box-shaped brass with polished chrome-plated finish.

- C. One-Piece, Cast-Brass Escutcheons: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Floor-Plate Escutcheons: Cast brass with concealed hinge and set screw.

2.8 SPECIALTIES

- A. Safety Valves: ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," construction; National Board certified, labeled, and factory sealed; constructed of bronze body with poppet-type safety valve for compressed-air service.
 - 1. Pressure Settings: Higher than discharge pressure and same or lower than receiver pressure rating.
- B. Air-Main Pressure Regulators: Bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 250-psig (1725-kPa) inlet pressure, unless otherwise indicated.
 - 1. Type: Pilot operated.
- C. Air-Line Pressure Regulators: Diaphragm operated, bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 200-psig (1380-kPa) minimum inlet pressure, unless otherwise indicated.
- D. Air-Line Pressure Regulators: Diaphragm operated, aluminum alloy or plastic body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 200-psig (1380-kPa) minimum inlet pressure, unless otherwise indicated.
- E. Automatic Drain Valves: Stainless-steel body and internal parts, rated for 200-psig (1380-kPa) minimum working pressure, capable of automatic discharge of collected condensate.
- F. Coalescing Filters: Coalescing type with activated carbon capable of removing water and oil aerosols; with color-change dye to indicate when carbon is saturated and warning light to indicate when selected maximum pressure drop has been exceeded. Include mounting bracket for wall mounting filters.
- G. Mechanical Filters: Two-stage, mechanical-separation-type, air-line filters. Equip with deflector plates, resin-impregnated-ribbon-type filters with edge filtration, and drain cock. Include mounting bracket for wall mounting filters.

H. Air-Line Lubricators: With drip chamber and sight dome for observing oil drop entering air stream; with oil-feed adjustment screw and quick-release collar for easy bowl removal. Include mounting bracket for wall mounting lubricators.

1. Provide with automatic feed device for supplying oil to lubricator.

2.9 QUICK COUPLINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aeroquip Corporation; Eaton Corp.
2. Bowes Manufacturing Inc.
3. Foster Manufacturing, Inc.
4. Milton Industries, Inc.
5. Parker Hannifin Corp.; Fluid Connectors Group; Quick Coupling Div.
6. Rectus Corp.
7. Schrader-Bridgeport; Amflo Div.
8. Schrader-Bridgeport/Standard Thomson.
9. Snap-Tite, Inc.; Quick Disconnect & Valve Division.
10. TOMCO Products Inc.
11. Tuthill Corporation; Hansen Coupling Div.
12. Or Approved Equal

B. General Requirements for Quick Couplings: Assembly with locking-mechanism feature for quick connection and disconnection of compressed-air hose.

C. Automatic-Shutoff Quick Couplings: Straight-through brass body with O-ring or gasket seal and stainless-steel or nickel-plated-steel operating parts.

1. Socket End: With one-way valve and threaded inlet for connection to piping or threaded hose fitting.
2. Plug End: Straight-through type with barbed outlet for attaching hose.

D. Valveless Quick Couplings: Straight-through brass body with stainless-steel or nickel-plated-steel operating parts.

1. Socket End: With O-ring or gasket seal, without valve, and with barbed inlet for attaching hose.
2. Plug End: With barbed outlet for attaching hose.

2.10 HOSE REEL ASSEMBLIES

- A. Description: Hose reels assemblies have to heavy duty spring retractable reels with 75 ft of ½” hose, similar to ReelCraft Model HD78075 OLP or approved equal from the following manufacturers:
1. Reelcraft
 2. Ingersoll Rand.
 3. Klutch
 4. Approved Equal

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING APPLICATIONS

- A. Compressed-Air Piping between Air Compressors and Receivers: Use the following piping materials for each size range:
1. NPS 1/2 to NPS 4: Type L (Type B), copper tube; wrought-copper fittings; and brazed joints.
- B. Low-Pressure Compressed-Air Distribution Piping: Use the following piping materials for each size range:
1. NPS 1/2 to NPS 4 Type L (Type B): copper tube; wrought-copper fittings; and brazed joints.
- C. Drain Piping: Use the following piping materials:
1. NPS 2 (DN 50) and Smaller: Type L copper tube; wrought-copper fittings; and brazed or soldered joints.

3.3 VALVE APPLICATIONS

- A. General-Duty Valves: Comply with requirements in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping" for metal general-duty valves. Use metal valves, unless otherwise indicated.
 - 1. Metal General-Duty Valves: Use valve types specified in "Valve Applications" Article in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping" according to the following:
 - a. Low-Pressure Compressed Air: Valve types specified for low-pressure compressed air.
 - b. Equipment Isolation NPS 2 (DN 50) and Smaller: Safety-exhaust, copper-alloy ball valve with exhaust vent and pressure rating at least as great as piping system operating pressure.

3.4 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping concealed from view and protected from physical contact by building occupants, unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and to coordinate with other services occupying that space.
- E. Install piping adjacent to equipment and machines to allow service and maintenance.
- F. Install air and drain piping with 1 percent slope downward in direction of flow.
- G. Install nipples, flanges, unions, transition and special fittings, and valves with pressure ratings same as or higher than system pressure rating, unless otherwise indicated.
- H. Equipment and Specialty Flanged Connections:



1. Use steel companion flange with gasket for connection to steel pipe.
 2. Use cast-copper-alloy companion flange with gasket and brazed or soldered joint for connection to copper tube. Do not use soldered joints for connection to air compressors or to equipment or machines producing shock or vibration.
- I. Flanged joints may be used instead of specified joint for any piping or tubing system.
 - J. Extended-tee outlets with brazed branch connection may be used for copper tubing, within extruded-tee connection diameter to run tube diameter ratio for tube type, according to Extruded Tee Connections Sizes and Wall Thickness for Copper Tube (Inches) Table in ASTM F 2014.
 - K. Install eccentric reducers where compressed-air piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.
 - L. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.
 - M. Install thermometer and pressure gage on discharge piping from each air compressor and on each receiver.
 - N. Install piping to permit valve servicing.
 - O. Install piping free of sags and bends.
 - P. Install fittings for changes in direction and branch connections.
 - Q. Install seismic restraints on piping where indicated on drawings.

3.5 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Brazed Joints for Copper Tubing: Join according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Join according to ASTM B 828 or CDA's "Copper Tube Handbook."

- E. Extruded-Tee Outlets for Copper Tubing: Form branches according to ASTM F 2104, with tools recommended by procedure manufacturer, and using operators qualified according to Part 1 "Quality Assurance" Article.
- F. Pressure-Sealed Joints: Join with tools recommended by fitting manufacturer, using operators qualified according to Part 1 "Quality Assurance" Article.
- G. Dissimilar Metal Piping Material Joints: Use dielectric fittings.

3.6 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section 220523 "General-Duty Valves for Plumbing Piping."
- B. Install shutoff valves and unions or flanged joints at compressed-air piping to air compressors.
- C. Install shutoff valve at inlet to each automatic drain valve, filter, lubricator, and pressure regulator.
- D. Install check valves to maintain correct direction of compressed-air flow to and from compressed-air piping specialties and equipment.

3.7 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. NPS 2 (DN 50) and Smaller: Use dielectric unions.

3.8 FLEXIBLE PIPE CONNECTOR INSTALLATION

- A. Install flexible pipe connectors in discharge piping and in inlet air piping from remote air-inlet filter of each air compressor.
- B. Install bronze-hose flexible pipe connectors in copper compressed-air tubing.
- C. Install stainless-steel-hose flexible pipe connectors in steel compressed-air piping.

3.9 SPECIALTY INSTALLATION

- A. Install safety valves on receivers in quantity and size to relieve at least the capacity of connected air compressors.
- B. Install air-main pressure regulators in compressed-air piping at or near air compressors.
- C. Install air-line pressure regulators in branch piping to equipment and tools.
- D. Install automatic drain valves on aftercoolers, receivers, and dryers. Discharge condensate onto nearest floor drain.
- E. Install coalescing filters in compressed-air piping at or near air compressors and upstream from mechanical filters. Mount on wall at locations indicated.
- F. Install mechanical filters in compressed-air piping at or near air compressors and downstream from coalescing filters. Mount on wall at locations indicated.
- G. Install air-line lubricators in branch piping to machine tools. Mount on wall at locations indicated.
- H. Install quick couplings at piping terminals for hose connections.
- I. Install hose assemblies at hose connections.

3.10 CONNECTIONS

- A. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment and machine.

3.11 SLEEVE AND ESCUTCHEON INSTALLATION

- A. Sleeves are not required for core-drilled holes.
- B. Permanent sleeves are not required for holes formed by removable PE sleeves.
- C. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs using galvanized-steel pipe.

- D. Install sleeves for pipes passing through concrete and masonry walls, gypsum board partitions, and concrete floor and roof slabs.
1. Wall Penetrations: Cut sleeves to length for mounting flush with both surfaces.
 2. Floor Penetrations: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
- E. Install sleeves in new walls and slabs as new walls and slabs are constructed.
- F. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
1. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 2. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Comply with requirements in Division 07 Section 076200 "Sheet Metal Flashing and Trim" for flashing.
 - a. Seal space outside of sleeve fittings with grout.
- G. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section 078413 "Penetration Firestopping".
- H. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
 3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
 4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish.
 5. Bare Piping in Equipment Rooms: One piece, cast brass with polished chrome-plated finish.
 6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.12 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support devices.
- B. Vertical Piping: MSS Type 8 or 42, clamps.
- C. Individual, Straight, Horizontal Piping Runs:
 - 1. 100 Feet (30 m) or Less: MSS Type 1, adjustable, steel clevis hangers.
 - 2. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
- D. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- E. Base of Vertical Piping: MSS Type 52, spring hangers.
- F. Support horizontal piping within 12 inches (300 mm) of each fitting and coupling.
- G. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1/4 (DN 8): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3/8 and NPS 1/2 (DN 10 and DN 15): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 3/4 (DN 20): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 - 4. NPS 1 (DN 25): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 5. NPS 1-1/4 (DN 32): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 - 6. NPS 1-1/2 (DN 40): 10 feet (3 m) with 3/8-inch (10-mm) rod.
- I. Install supports for vertical copper tubing every 10 feet (3 m).

3.13 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:



1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish.
5. Bare Piping in Equipment Rooms: One piece, cast brass with polished chrome-plated finish.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.14 LABELING AND IDENTIFICATION

- A. Install identifying labels and devices for general-service compressed-air piping, valves, and specialties. Comply with requirements in Division 22 Section 220553 "Identification for Plumbing Piping and Equipment."

3.15 FIELD QUALITY CONTROL

- A. Perform field tests and inspections.
- B. Tests and Inspections:
 1. Piping Leak Tests for Metal Compressed-Air Piping: Test new and modified parts of existing piping. Cap and fill general-service compressed-air piping with oil-free dry air or gaseous nitrogen to pressure of 50 psig (345 kPa) above system operating pressure, but not less than 150 psig (1035 kPa) . Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
 2. Repair to restore leak free system and retest until no leaks exist.
 3. Inspect filters, lubricators and pressure regulators for proper operation.
- C. Prepare test reports.

END OF SECTION 221513

SECTION 221519

GENERAL SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes:
 - 1. Lubricated, reciprocating air compressors.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Wiring Diagrams: For power, signal, and control wiring.
 - 2. Air Compressor
- B. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, by a qualified testing agency, and marked for intended location and application.
- C. ASME Compliance: Fabricate and label receivers to comply with ASME Boiler and Pressure Vessel Code.

1.6 PERFORMANCE REQUIREMENTS

- A. Engineering Services: Design compressed-air equipment mounting, including comprehensive engineering analysis by a qualified professional engineer licensed in State of New York, using performance requirements and design criteria indicated.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PACKAGED AIR COMPRESSORS AND RECEIVERS

- A. General Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty air compressors and receivers that deliver air of quality equal to intake air.
- B. Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.
1. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.
 2. Motor Controllers: Full-voltage, combination magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.
 3. Control Voltage: 120-V ac or less, using integral control power transformer.
 4. Motor Overload Protection: Overload relay in each phase.
 5. Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.
 6. Automatic control switches to air compressors.
 7. Instrumentation: Include discharge-air pressure gage, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gages, and control transformer.
 8. Alarm Signal Device: For connection to alarm system to indicate when backup air compressor is operating.
- C. Receivers: Steel tank constructed according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
1. Pressure Rating: At least as high as highest discharge pressure of connected compressors and bearing appropriate code symbols.
 2. Interior Finish: Corrosion-resistant coating.
 3. Accessories: Include safety valve, pressure gage, drain, and pressure-reducing valve.
- D. Mounting Frame: Fabricate mounting and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure.

2.2 LUBRICATED, RECIPROCATING AIR COMPRESSORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide air compressor similar to Quincy QT Model QT-7.5 or comparable product by one of the following:
1. General Air Products, Inc.
 2. Ingersoll-Rand; Air Solutions Group.
 3. Kaeser Compressors, Inc.
 4. Powerex, Inc.
 5. Approved Equal
- B. Compressor: Lubricated, reciprocating-piston type with lubricated compression chamber and crankcase.
1. Submerged gear-type oil pump.
 2. Oil filter.
 3. Combined high discharge-air temperature and low lubrication-oil pressure switch.
 4. Belt guard totally enclosing pulleys and belts.
- C. Capacities and Characteristics:
1. Air Compressor Two stage.
 - a. Intercooler between stages of two-stage units.
 2. Actual-Air Capacity of Each Air Compressor: 22.6 ACFM delivered.
 3. Discharge-Air Pressure: 175 psi
 4. Intake-Air Temperature:
 5. Discharge-Air Temperature:
 6. Mounting: Tank mounted.
 7. Motor (Each Air Compressor):
 - a. Horsepower: 7.5 HP
 - b. Speed: 1310 rpm.
 8. Unit Electrical Characteristics:
 - a. Volts: 208
 - b. Phase(s): 3
 - c. Hertz: 60 Hz.
 9. Receiver: ASME construction steel tank.
 - a. Arrangement: Vertical.
 - b. Capacity: 80 gal. (L).
 - c. Interior Finish: Epoxy or galvanized coating.
 - d. Pressure Rating: 250 psig (1725 kPa) minimum.
 - e. Pressure Regulator Setting: 100 psig (kPa).

- f. Pressure Relief Valve Setting: 125 psi.
- g. Drain: Automatic valve.

2.3 INLET-AIR FILTERS

- A. Description: Combination inlet-air filter-silencer, suitable for remote installation, for each air compressor.
 - 1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
 - 2. Capacity: Match capacity of air compressor, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.
- B. Description: Combination inlet-air filter-silencer, suitable for remote installation, for multiple air compressors.
 - 1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
 - 2. Capacity: Match total capacity of connected air compressors, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EQUIPMENT INSTALLATION

- A. Equipment Mounting: Install air compressors on vibration isolation pads. Retain first paragraph below for equipment installed on concrete bases without vibration isolation devices. This may be appropriate for rotary compressors on structural slabs-on-grade.
- B. Equipment Mounting: Install air compressors on concrete bases. Comply with requirements in Division 03 Section 033300 "Architectural Concrete."
- C. Install compressed-air equipment anchored to substrate.
- D. Install the following devices on compressed-air equipment:
 - 1. Thermometer, Pressure Gage, and Safety Valve: Install on each compressed-air receiver.
 - 2. Pressure Regulators: Install downstream from air compressors.
 - 3. Automatic Drain Valves: Install on aftercoolers, receivers, and dryers. Discharge condensate over nearest floor drain.

- E. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Check for lubricating oil in lubricated-type equipment.
 - 3. Check belt drives for proper tension.
 - 4. Verify that air-compressor inlet filters and piping are clear.
 - 5. Check for equipment vibration-control supports and flexible pipe connectors and verify that equipment is properly attached to substrate.
 - 6. Check safety valves for correct settings. Ensure that settings are higher than air-compressor discharge pressure but not higher than rating of system components.
 - 7. Check for proper seismic restraints.
 - 8. Drain receiver tanks.
 - 9. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 10. Test and adjust controls and safeties.

3.3 CONNECTIONS

- A. Comply with requirements for piping specified in Division 22 Section 221513 "General-Service Compressed-Air Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.

3.4 IDENTIFICATION

- A. Identify general-service air compressors and components. Comply with requirements for identification specified in Division 22 Section 220553 "Identification for Plumbing Piping and Equipment."

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to instruct City of New York's maintenance personnel to adjust, operate, and maintain air compressors.

END OF SECTION 221519

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SECTION 22 33 00

ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Commercial, storage electric water heaters.
 - 2. Water heater accessories.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.
- D. Warranty.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100 and marked for intended use.

- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with potable water.

1.6 WARRANTY

- A. Manufacturer's Warranty: 5 years from substantial completion.

PART 2 - PRODUCTS

2.1 COMMERCIAL ELECTRIC WATER HEATERS

- A. Commercial, Storage Electric Water Heaters: Comply with UL 1453 requirements for storage-tank-type water heaters.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Electric Heater Company (The); Hubbell Heaters Division.
 - b. Smith, A. O. Water Products Company.
 - c. State Industries, Inc.
 - d. Or Approved Equal.
 - 2. Storage-Tank Construction: Non-ASME-code, steel vertical arrangement.
 - a. Tappings: Factory fabricated of materials compatible with tank and piping connections. Attach tappings to tank before testing.
 - 1) NPS 2 (DN 50) and Smaller: Threaded ends according to ASME B1.20.1.
 - b. Pressure Rating: 150 psig (1035 kPa).
 - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
 - 3. Factory-Installed Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
 - c. Insulation: Comply with ASHRAE/IESNA 90.1.
 - d. Jacket: Steel with enameled finish.
 - e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.



- 1) Staging: Input not exceeding 18 kW per step.
 - f. Temperature Control: Adjustable immersion thermostat with 90-140 deg F range.
 - g. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
 - h. Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3, for combination temperature and pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.
4. Special Requirements: NSF 5 construction.
 5. Energy Management System Interface: Normally closed dry contacts for enabling and disabling water heater.
 6. Capacity and Characteristics WH-1
 - a. Capacity: 100 gal.
 - b. Recovery: 73.8 gph at 100 deg F (56 deg C) temperature rise.
 - c. Temperature Setting: 140 deg F.
 - d. Number of Heating Elements: Two, working simultaneously.
 - e. Electrical Characteristics:
 - 1) Power Demand: 18 kw
 - 2) Volts: 208V
 - 3) Phases: Three.
 - 4) Hertz: 60.

2.2 HOT WATER CIRCULATOR

A. Commercial Hot Water Circulators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bell and Gossett.
 - b. Taco
 - c. Grundfos
 - d. Or Approved Equal
2. Pump must be LEAD-free, horizontal, oil-lubricated type, rated for 125 psi.
3. The motor must be of the drip-proof, sleeve-bearing, quiet operating, rubber-mounted construction. Motors must have built-in thermal overload protectors.
4. For pump model and rating refer to schedule on contract drawings.

2.3 AQUASTATS AND TIMERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Automatic Timer and Aquastat Combination consisting of automatic timer kit TC-1 by Bell and Gossett and AQ-1/2 aquastat by Bell and Gossett or comparable product by one of the following:
1. Taco
 2. Grundfos
 3. Or Approved Equal

2.4 EXPANSION TANK

- A. Expansion Tank must be listed for Portable Water applications with all wetted components to be FDA approved.
- B. Tank must be bladder type with steel shell designed and constructed per ASMe Section VIII, Div.1 and heavy duty butyl bladder
- C. Tank must be rated for 125 psig, 240 degree F.

2.5 WATER HEATER ACCESSORIES

- A. Water Heater Stands: Water heater manufacturer's factory-fabricated steel stand for floor mounting and capable of supporting water heater and water. Include dimension that will support bottom of water heater a minimum of 18 inches (457 mm) above the floor.
- B. Water Heater Mounting Brackets: Water heater manufacturer's factory-fabricated steel bracket for wall mounting and capable of supporting water heater and water.
- C. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of water heater and include drain outlet not less than NPS 3/4 (DN 20).
- D. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1 or ASHRAE 90.2.
- E. Water Regulators: ASSE 1003, water-pressure reducing valve. Set at 25-psig- (172.5-kPa-) maximum outlet pressure, unless otherwise indicated.
- F. Shock Absorbers: ASSE 1010 or PDI WH 201, Size A water hammer arrester.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 WATER HEATER INSTALLATION

- A. Install commercial water heaters on concrete bases.
 - 1. Exception: Omit concrete bases for commercial water heaters if installation on stand, bracket, suspended platform, or direct on floor is indicated.
 - 2. Concrete base construction requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- B. Install water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
- C. Install combination temperature and pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial, water-heater, relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- D. Install water heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for water heaters that do not have tank drains. Refer to Division 22 Section 221119 "Domestic Water Piping Specialties" for hose-end drain valves.
- E. Install thermometer on outlet piping of water heaters.
- F. Install water regulator, with integral bypass relief valve, in booster-heater inlet piping and water hammer arrester in booster-heater outlet piping.
- G. Install piping-type heat traps on inlet and outlet piping of water heater storage tanks without integral or fitting-type heat traps.
- H. Fill water heaters with water.

3.3 CONNECTIONS

- A. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of water heaters.
- B. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems".

- C. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including connections.
- B. Perform the following field tests and inspections:
 - 1. Leak Test: After installation, test for leaks. Repair leaks to restore to leak free condition and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.

3.5 DEMONSTRATION

- A. Engage a factory service representative to instruct City of New York's maintenance personnel to adjust, operate, and maintain commercial electric water heaters.

END OF SECTION 223300

SECTION 22 40 00

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes the following:
1. Faucets for lavatories and sinks.
 2. Flushometers
 3. Showers
 4. Toilet seats.
 5. Protective shielding guards.
 6. Fixture supports.
 7. Water closets.
 8. Urinals.
 9. Lavatories.
 10. Pantry sinks.
 11. Mop sinks.
 12. Drinking Fountain.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 013300 “Submittal Procedures”.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70-2010, Article 100 and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1-2009, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- D. Regulatory Requirements: Comply with requirements of New York City Plumbing code Section 604 for maximum flow rates and consumption for water fixtures and WaterSense program labeling requirements.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 - 2. Plastic Laundry Trays: ANSI Z124.6.
 - 3. Plastic Shower Enclosures: ANSI Z124.2.
 - 4. Plastic Sinks: ANSI Z124.6.
 - 5. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 - 6. Slip-Resistant Bathing Surfaces: ASTM F 462.
 - 7. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
 - 8. Stainless-Steel Residential Sinks: ASME A112.19.3.
 - 9. Vitreous-China Fixtures: ASME A112.19.2M.
 - 10. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
 - 11. Water-Closet, Flushometer Tank Trim: ASSE 1037.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
 - 2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
 - 3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.



4. Faucets: ASME A112.18.1.
5. Hose-Connection Vacuum Breakers: ASSE 1011.
6. Hose-Coupling Threads: ASME B1.20.7.
7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
8. NSF Potable-Water Materials: NSF 61.
9. Pipe Threads: ASME B1.20.1.
10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
11. Supply Fittings: ASME A112.18.1.
12. Brass Waste Fittings: ASME A112.18.2.

J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:

1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Dishwasher Air-Gap Fittings: ASSE 1021.
4. Manual-Operation Flushometers: ASSE 1037.
5. Plastic Tubular Fittings: ASTM F 409.
6. Brass Waste Fittings: ASME A112.18.2.
7. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

K. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Disposers: ASSE 1008 and UL 430.
2. Dishwasher Air-Gap Fittings: ASSE 1021.
3. Flexible Water Connectors: ASME A112.18.6.
4. Grab Bars: ASTM F 446.
5. Hose-Coupling Threads: ASME B1.20.7.
6. Off-Floor Fixture Supports: ASME A112.6.1M.
7. Pipe Threads: ASME B1.20.1.
8. Plastic Toilet Seats: ANSI Z124.5.
9. Supply and Drain Protective Shielding Guards: ICC A117.1-2009.

1.6 DEFINITIONS

- A. Retain abbreviations and terms that remain after this Section has been edited.
- B. ABS: Acrylonitrile-butadiene-styrene plastic.
- C. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- D. FRP: Fiberglass-reinforced plastic.

- E. PMMA: Polymethyl methacrylate (acrylic) plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS

A. Lavatory Faucets, L:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant metering faucet Chicago Faucets Model 802-V336CP or comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Delta Faucet Company.
 - c. Kohler Co.
 - d. Zurn Plumbing Products Group; Commercial Brass Operation.
 - e. Or Approved Equal.
2. Description: ADA Compliant, metering:
 - a. Body Material: Commercial, solid brass.
 - b. Finish: Polished chrome plate.
 - c. Maximum Flow Rate: 0.25 gallon/ cycle.
 - d. Centers: 4".
 - e. Mounting: Deck, exposed.
 - f. Valve Handle(s): Not applicable.
 - g. Inlet(s): NPS 3/8.
 - h. Spout: Rigid type.
 - i. Drain: Chrome Plated Brass Grid Strainer Sloan ETF-460A.
 - j. Tempering Device: n/a
 - k. Variation: n/a
 - l. Transformer: n/a
 - m. Time Out Setting: 12 seconds.
 - n. Cycle: 0.25 gallon per cycle.

2.2 SINK FAUCETS

A. Sink Faucets, PS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide kitchen sink Chicago Faucets Model 51-L12ABCP or a comparable product by one of the following:
 - a. Eljer.
 - b. Kohler Co.
 - c. Elkay
 - d. Or Approved Equal.

2. Description: Kitchen faucet with spray, three-hole fixture. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
 - a. Body Material: Commercial, solid brass.
 - b. Finish: Polished chrome plate.
 - c. Maximum Flow Rate: 2.2 gpm.
 - d. Mixing Valve: Two-lever handle.
 - e. Backflow Protection Device for Hose Outlet: Not required.
 - f. Backflow Protection Device for Side Spray: Not required.
 - g. Centers: 8 inches (203 mm).
 - h. Mounting: Deck, exposed.
 - i. Handle(s): Wrist blade, 4 inches (102 mm).
 - j. Inlet(s): NPS 1/2 (DN 15).
 - k. Spout Type: Field-convertible gooseneck rigid/swivel gooseneck spout.
 - l. Spout Outlet: Aerator.
 - m. Vacuum Breaker: Not required.
 - n. Operation: Compression, manual.
 - o. Drain: Grid.

B. Mop Sink Faucets, MS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide service sink faucet Chicago 814-CP or a comparable product by one of the following:
 - a. Eljer.
 - b. Kohler Co.
 - c. American Standard
 - d. Or Approved Equal.



2. Description: Service Sink faucet with vacuum breaker, integral stops, adjustable wall brace, pail hook and 3/4" hose thread on spout.
 - a. Body Material: Commercial, solid brass.
 - b. Finish: Chrome plate.
 - c. Maximum Flow Rate: 2.2 gpm.
 - d. Mixing Valve: not required.
 - e. Backflow Protection Device for Hose Outlet: Not required.
 - f. Backflow Protection Device for Side Spray: Not required.
 - g. Centers: 8 inches (203 mm).
 - h. Mounting: Wall, exposed.
 - i. Handle(s): Four arm handle.
 - j. Inlet(s): NPS 1/2 (DN 15).
 - k. Spout Type: rigid spout.
 - l. Spout Outlet: Threaded
 - m. Vacuum Breaker: required.
 - n. Operation: Manual.
 - o. Drain: Grid.

2.3 FLUSHOMETERS

A. Flushometers, WC:

1. Basis-of-Design Product: Subject to compliance with requirements, provide flushometer American Standard Model 111-1.28 or a comparable product by one of the following:
 - a. Sloan.
 - b. Zurn Plumbing Products Group; Commercial Brass Operation.
 - c. Toto.
 - d. Or Approved Equal.
2. Description: Exposed, Manual Flushometer for water-closet-type fixture. Include brass body with corrosion-resistant internal components, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.
 - a. Internal Design: piston operation.
 - b. Style: Exposed, chrome plated.
 - c. Inlet Size: NPS 1 (DN 25).
 - d. Trip Mechanism: Manual.
 - e. Consumption: 1.28 gal./flush.
 - f. Tailpiece Size: NPS 1-1/2 (DN 40).



B. Flushometers, UR:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant flushometer Sloan Royal Model 180-0.5, 3/4" spud, or a comparable product by one of the following:
 - a. Sloan Valve Company.
 - b. Zurn Plumbing Products Group; Commercial Brass Operation.
 - c. American Standard
 - d. Or Approved Equal.

2. Description: Flushometer for urinal fixture. Include brass body with corrosion-resistant internal components, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.
 - a. Internal Design: piston operation.
 - b. Style: Exposed, chrome plated.
 - c. Inlet Size: NPS 3/4 (DN 20).
 - d. Trip Mechanism: manual.
 - e. Consumption: 0.5 gal./flush.
 - f. Tailpiece Size: NPS 1 (DN 25).

2.4 SHOWERS, SH:

A. Shower Faucets, SH:

1. Basis-of-Design Product: Provide ADA compliant, shower unit Acorn Shower-Ware Model 450 BADA with Flow Control Hand Held Shower, or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Kohler Co.
 - c. Zurn Plumbing Products Group.
 - d. Or Approved Equal.

2. Description: Single-handle thermostatic and pressure-balance valve. Include hot- and cold-water indicators; check stops; and hand-held shower. Coordinate faucet inlets with supplies and outlet with diverter valve.
 - a. Body Material: Solid brass.
 - b. Finish: Polished chrome plate.



- c. Maximum Flow Rate: 1.5 gpm, unless otherwise indicated.
 - d. Diverter Valve: Not required.
 - e. Mounting: Exposed.
 - f. Antiscald Device: Integral with mixing valve.
 - g. Check Stops: Check-valve type, integral with or attached to body; on hot- and cold-water supply connections.
 - h. Supply Connections: NPS 1/2 (DN 15) Sweat.
- B. Shower Basin: Precast terrazzo one piece receptor for wheelchair accessibility similar to FIAT Model ADAWN6036. Install per manufacturer's recommendations and in accordance to details on A-series drawings.
- C. Shower Drain in shower basin: comply with specification Section 221319 "Sanitary Waste Piping Specialties".

2.5 TOILET SEATS

A. Toilet Seats, WC:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide toilet seat Olsonite Model 95CT:
 - a. Bemis Manufacturing Company.
 - b. Church Seats.
 - c. Olsonite.
 - d. Or Approved Equal.
- 2. Description: Toilet seat for water-closet-type fixture.
 - a. Material: Molded, solid plastic with antimicrobial agent.
 - b. Configuration: Open front, without cover.
 - c. Size: Elongated.
 - d. Hinge Type: SS.
 - e. Class: Heavy-duty commercial.
 - f. Color: White.

2.6 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:



1. Basis-of-Design Product: Subject to compliance with requirements, provide waste and supply piping protective covers, ADA compliant, consisting of one P-trap cover and two angle valves and supplies covers, Lav Guard Model 3102 E-Z by Truebro or equal by one of the following manufacturers:
 - a. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
 - b. McGuire Manufacturing Co., Inc.
 - c. Zurn Plumbing Products Group.
 - d. Or Approved Equal
2. Install on all ADA lavatories.

2.7 FIXTURE SUPPORTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Josam Company.
 2. MIFAB Manufacturing Inc.
 3. Smith, Jay R. Mfg. Co.
 4. Tyler Pipe; Wade Div.
 5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
 6. Zurn Plumbing Products Group; Specification Drainage Operation.
 7. Or Approved Equal.
- B. Water-Closet Supports, WC:
 1. Description: Combination carrier designed for accessible and standard mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.
- C. Lavatory Supports, L:
 1. Description: Type II, lavatory carrier with coated concealed arms, tie rod and floor mounted uprights, heavy duty, for floor or wall wall-mounting, lavatory-type fixture. Include steel uprights with feet.
 2. Accessible-Fixture Support: Include rectangular steel uprights.
- D. Urinal Supports, UR:



1. Description: Urinal carrier with back plate, wall hangers and floor mounted uprights, for wall-mounting, urinal-type fixture. Include steel uprights with feet.

2.8 WATER CLOSETS

A. Water Closets, WC:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant water closet by American Standard Afwall 2257.101 or a comparable product by one of the following:
 - a. American Standard
 - b. Kohler Co.
 - c. TOTO USA, Inc.
 - d. Or Approved Equal
2. Description: Accessible, wall-mounting, vitreous-china fixture designed for flushometer valve operation.
3. Style: Flushometer valve.
 - a. Bowl Type: Elongated with siphon-jet design. Include bolt caps matching fixture.
 - b. Height: Standard and Accessible where indicated on architectural drawings.
 - c. Design Consumption: 1.28 gal./flush.
 - d. Color: White.
 - e. Spud: 1-1/2" top inlet spud.
4. Toilet Seat: WC.

2.9 URINALS

A. Urinals, UR:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant urinal American Standard "Washbrook FlowWise" Model 6590.501 or a comparable product by one of the following:
 - a. Kohler Co.
 - b. TOTO USA, Inc.
 - c. American Standards, Inc.
 - d. Or Approved Equal.



2. Description: Accessible, wall-mounting, top spud, vitreous-china fixture designed for flushometer valve operation.
 - a. Type: Washout flush action.
 - b. Strainer or Trapway: Integral cast strainer with integral trap.
 - c. Design Consumption: 0.5 gal./flush.
 - d. Color: White.
 - e. Supply Spud Size: NPS 3/4 (DN 20).
 - f. Outlet Size: NPS 2 (DN 50).
 - g. Flushometer: UR.
 - h. Fixture Support: Urinal UR chair carrier.

2.10 LAVATORIES

A. Lavatories, L:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant lavatory Kohler Model K-2867 or a comparable product by one of the following:
 - a. Zurn
 - b. TOTO USA, Inc.
 - c. American Standard, Inc.
 - d. Or Approved Equal.
2. Description: Accessible, wall-mounting, enameled cast iron.
 - a. Type: With back.
 - b. Size: 20 by 18 inches (508 by 457 mm) rectangular.
 - c. Faucet Hole Punching: 4" centers.
 - d. Faucet Hole Location: Top.
 - e. Pedestal: Not required.
 - f. Color: White.
 - g. Faucet: Lavatory L.
 - h. Supplies: NPS 3/8 (DN 10) chrome-plated copper with stops.
 - i. Drain: Grid.
 - 1) Location: Near back of bowl.
 - j. Drain Piping: NPS 1-1/4 by NPS 1-1/2 (DN 32 by DN 40) chrome-plated, cast-brass P-trap; tubular brass waste to wall and wall escutcheon.
 - k. P-trap with Trap Primer: chrome plated, p-trap with trap primer with trip priming connection and stainless steel braided hose.



- l. Fixture Support: Lavatory L.
- m. Provide protective shielding for water supplies and drain.

2.11 PANTRY SINKS

A. Pantry Sinks, PS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay single bowl sink Model LR2219-1 or a comparable product by one of the following:
 - a. Kohler Co.
 - b. Eljer.
 - c. Elkay.
 - d. Or Approved Equal.
2. Description: One-bowl, undermount, stainless-steel kitchen sink.
 - a. Overall Dimensions: 22"x 19-1/2"
 - b. Metal Thickness: #18 gauge.
 - c. Bowl:
 - 1) Dimensions: 19"x16".
 - 2) Drain: 3-1/2-inch crumb cup.
 - a) Location: Near back of bowl.
 - d. Sink Faucet:PS
 - e. Supplies: NPS 1/2 (DN 15) chrome-plated copper with stops.
 - f. Drain Piping: NPS 2 (DN 40) chrome-plated, cast-brass P-trap; tubular brass waste to wall; and wall escutcheon(s).
 - g. Disposer: Not required.
 - h. Dishwasher Air-Gap Fitting: Not required.
 - i. Hot-Water Dispenser: Not required.

2.12 SERVICE SINKS

A. Mop Sinks, MS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide precast terrazzo mop sink basin Fiat Model TSB 3000 with stainless steel caps on all curbs and wall guards similar to FIAT Model MSG or comparable product by one of the following:
 - a. Kohler Co.



- b. Eljer.
 - c. FIAT.
 - d. Or Approved Equal.
2. Description: Precast basin made of marble chips.
- a. Overall Dimensions: 24”x 24”x12”
 - c. Sink Faucet: MS.
 - d. Supplies: NPS 1/2 (DN 15) chrome-plated copper with stops.
 - e. Drain Piping: NPS 3 (DN 80).

2.13 DRINKING FOUNTAIN WITH BOTTLE FILLING STATION.

A. Drinking fountain, DF:

1. Basis-of-Design Product: Subject to compliance with requirements, provide drinking fountain Halsey-Taylor Model HTHB-HRFSEBP-I Contour Bi-Level wall mount fountain Barrier-Free with HydroBoost or a comparable product by one of the following:
- a. Haws
 - b. Oasis
 - c. Elkay
 - d. Or Approved Equal
2. Description: No-Lead, ADA compliant, two-level wall mounted Drinking Fountain with Bottle Filling Station.
- a. Body Material: Commercial, solid brass.
 - b. Finish: Stainless Steel gauge #18
 - c. Maximum Flow Rate: 1.5 gpm.
 - d. Bottle Filler: no-touch, sensor –activated bottle filler.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install fixtures level and plumb according to roughing-in drawings.
- G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- K. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- L. Install toilet seats on water closets.
- M. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

- N. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- O. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- P. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- Q. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- R. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- S. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install in sink deck. Connect inlet hose to dishwasher and outlet hose to disposer.
- T. Install hot-water dispensers in back top surface of sink or in countertop with spout over sink.
- U. Install escutcheons at piping wall and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section 220500 "Common Work Results for Plumbing."
- V. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section 079200 "Joint Sealants."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

3.5 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Commissioner.

END OF SECTION 22 40 00



SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes
1. The requirements that apply to all the Work of Division 23.

1.3 SUBMITTAL

- A. Submittal Procedures: Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. General:
1. All equipment and accessories must be the product of a manufacturer regularly engaged in its manufacture.
 2. All equipment and accessories new, free from defects.
 3. Supply all equipment and accessories in compliance with the applicable standards listed in this Section and with all applicable national, state and local codes.
 4. All items of a given type must be the product of the same manufacturer.
 5. Install work by craftsmen skilled in trade involved.
- C. Requirement of regulatory agencies:
1. Nothing in the Drawings or Specifications will be construed to permit Work not conforming to applicable laws, ordinances, rules or regulations.
 2. When Drawings or Specifications exceed requirements of applicable laws, ordinances, rules or regulations, Drawings and Specifications take precedence.
 3. It is not the intent of Drawings and Specifications to repeat requirements of codes except where necessary for completeness or clarity.
 4. If any of the requirements of the above are in conflict with one another, or with the requirements of this specification, the most stringent requirements shall govern.
 5. 2014 NYC Building Code.
- D. Materials and equipment must be manufactured, installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:
1. Local and state building, plumbing, mechanical, electrical, fire and health department codes.



2. 2014 NYC Building Code
3. 2014 NYC Mechanical Code
4. 2014 NYC Fire Code
5. 2014 NYC Fuel Gas Code
6. American Gas Association (AGA)
7. National Fire Protection Association (NFPA)
8. American Insurance Association (AIA) (formerly National Board of Fire Underwriters)
9. Occupational Safety and Health Act (OSHA)
10. Underwriter’s Laboratories (UL).
11. Factory Mutual Association (FM)
12. National Electric Code (NEC)
13. Environmental Protection Agency (EPA)
14. National Bureau of Standards (NBS)

- E. All materials and equipment must be listed by Underwriters’ Laboratories (UL), and approved by ASME, ANSI, ASTM, AGA, and NEC for intended service.

1.5 SCOPE AND COORDINATION

- A. Perform work and provide material and equipment as shown on the drawings and/or as specified and/or as indicated in this section of the specifications. Completely coordinate all work of this section with work of other trades and provide a complete and fully functional installation.
- B. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly require by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for sound, secure and complete installation.

1.6 RELATED WORK

- A. Related work specified elsewhere: The following work, unless otherwise noted is not included in this section may be performed in other sections:
1. Provide factory built Variable Refrigerant Flow (VRF) heat pump recovery type air conditioning units complete with filtration kits and factory furnished controls.
 2. Provide energy recovery ventilator (ERV) providing sensible and latent heat recovery between outdoor air and exhaust air streams. Integrate control of the ERV into the VRF system controls.
 3. Provide a complete emergency vehicle exhaust capture system to source capture 100% of the exhaust emissions directly at the tail pipe of the vehicle and exhaust those emissions safely outside the building as indicated on plans and as specified.
 4. Provide stainless steel welded duct for vehicle exhaust capture system.
 5. Provide split system cooling for server room and elevator machine room temperature control.
 6. Coordinate and provide supplementary dunnage steel for rooftop condensing units and other rooftop equipment.
 7. Provide all vibration isolation and noise control.
 8. Provide all diffusers, grilles and registers as shown on drawings and as specified hereinafter.



9. Provide all volume and fire dampers, transfer ducts & air inlets and outlets as noted on plans and as specified hereinafter.
10. Provide all ducting, all access doors, all control wiring and conduits, all insulation, all duct lining, all hangers and supports and all other accessories required for the proper installation and performance of the equipment.
11. Testing, balancing, and adjusting of the new heating & cooling system as specified hereinafter.
12. Coordinate with general construction trade for all cores and other openings in exterior walls, interior partitions, slabs, roofing, etc., for ducts, piping, sleeves, conduits, and other penetrations.
13. Provide all sleeves, conduit, escutcheons, etc. in the wall/floor/roof penetrations. Coordinate with general construction trade for fire stopping and/or insulation at all penetrations around the ducts, and conduit, etc.
14. Provide all hoisting and rigging of equipment and material required to complete work of this section.
15. Provide all vibration and noise control to include vibration isolation, sound attenuators, soundproofing of installation as specified hereinafter, etc.
16. Provide testing to establish ambient noise levels and submit test report to in accordance with requirements of NYC 2014 Mechanical Code, Section MC 926 to the Commissioner prior to review and approval of new equipment.
17. Provide testing to establish ambient noise levels and submit test report to in accordance with requirements of NYC 2014 Mechanical Code, Section MC 926 to the Commissioner upon installation and testing adjusting and balancing of new equipment.

1.7 MODIFICATIONS IN LAYOUT

- A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show exact routings and locations needed to coordinate with structure and other trades to meet Architectural requirements.
- B. To obtain the Commissioner's desired aesthetics in spaces used by building occupants, in all such spaces, prior to installation of visible materials, finishes and equipment (including access panels), review Architectural Drawings for desired locations and where not definitely indicated, request information from the Commissioner.
- C. Check Contract Drawings, as well as Shop Drawings, of all trades to verify and coordinate spaces in which work of this section will be installed.
- D. Maintain maximum headroom at all locations. All piping, duct conduit, and associated components to be as tight to underside of structure as possible.
- E. Make reasonable modifications in layout and components to prevent conflict with work of other trades and to coordinate according to Paragraphs A,B,C,D above. Systems will be run in a rectilinear fashion.
- F. Where conflicts or potential conflict exists and engineering guidance is desired, submit sketch of proposed resolution to Commissioner for review and approval.



1.8 MEASUREMENTS

- A. Contractor must base all measurements, both horizontal and vertical from established benchmark. All work must agree with these established lines and levels. Verify all measurements at site; and check the correctness of same as related to the work.

1.9 MATERIALS AND WORKMANSHIP

- A. Materials must be new, meet detailed requirements of the Contract Documents and be identifiable as being specified or substitute products.
- B. Materials which do not conform to the requirements of the Contract Documents, are not equal to approved samples or are unsatisfactory or unsuited to the purpose for which they are intended, will be rejected.
- C. All work must be performed in the best and most workmanlike manner by plumbers and mechanics skilled in their respective trades and properly licensed.
- D. All equipment must be installed in accordance with the recommendation of the manufacturer.
- E. Defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or other cause must be removed within ten (10) days after written notice is given by the Commissioner and the work must be re-executed by the contractor. The fact that the Commissioner may have previously overlooked such defective work will not constitute total or partial acceptance of it.

1.10 CHECKING AND TESTING EQUIPMENT BY MANUFACTURER'S REPRESENTATIVE

- A. All equipment must be installed in strict accordance with manufacturer's instructions. During construction request supervisory assistance from equipment manufacturer's representatives so the equipment will be correctly installed. After installation, request the Commissioner to inspect and see the equipment is in proper working order.
- B. Manufacturer's representative may review the overall system design relative to the proper application of the equipment in the system. The representative will note conduit, wiring, control, location, and other relevant relationships, and furnish appurtenances necessary for satisfactory operation.
- C. Submit to the Commissioner a signed statement certifying:
 - 1. The equipment is properly installed and ready for operation
 - 2. The City of New York's maintenance representatives have been thoroughly instructed
 - 3. Maintenance and operation manuals issued and accepted by the Commissioner.

1.11 COORDINATION DRAWINGS

- A. A single set of coordination drawings must be mutually prepared by all mechanical and electrical trades.



- B. The Sheet Metal sub-contractor must prepare a complete set of background drawings at scale not less than 3/8" equals 1'-0", showing structure and other information as needed for coordination and show sheet metal layout thereon. These will be Coordination Drawings.
- C. Each of the mechanical, electrical and other specialty trade must add its work to these background drawings with appropriate elevations and grid dimensions. Specialty trade information is required for fan rooms and mechanical rooms, horizontal exits from duct shafts, crossovers, and for spaces in and above ceilings where congestion of work may occur such as corridors, and even entire floors. Drawings must indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services.
- D. Each specialty trade must sign and date each coordination drawing. Return drawing to the Commissioner, who must route them sequentially to all specialty trades.
- E. Where conflicts occur with placement of materials of various trades, the Contractor will be responsible to coordinate the available space to accommodate all trades. Any resulting adjustments must be initialed and dated by specialty trade. The Sheet Metal sub-contractor must then final date and sign each drawing. If the trade cannot resolve conflicts, the decision of the Contractor must be final.
- F. A Contractor who fails to promptly review and incorporate the work on the drawings must assume full responsibility of any installation conflicts affecting the work and of any schedule ramifications.
- G. Make coordination drawings in CAD format. Fabrication must not start until completed coordination drawings are received by the Commissioner and have been reviewed.
- H. Review of coordination drawings must not diminish responsibility under this section for final coordination of installation and maintenance clearances of all systems and equipment with Architectural, Structural, Mechanical, Electrical and other work.
- I. After review:
 - 1. After review of coordination drawings, the method used to resolve interferences not previously identified must be as in "MODIFICATIONS IN LAYOUT" above.
 - 2. All changes to reviewed coordination drawings must be in writing by the Commissioner prior to start of work in affected area.
- J. Distribution of Coordination Drawings:
 - 1. Digital copy in CAD format of the Coordination Drawings to each specialty trade and affected trade for their use.
- K. All firewalls and smoke partitions must be highlighted on coordination drawings for appropriate coordination.
- L. The main paths of egress and for equipment removal from main mechanical and electrical rooms must be clearly shown on coordination drawings.
- M. Coordination Drawings will include, but not limited to:
 - 1. Plumbing systems, piping and equipment.



2. HVAC piping, systems and equipment.
3. Control systems.
4. Electrical distribution, systems and equipment.
5. Lighting systems and fixtures.
6. Sheet metal work, components and accessories, costs and boxes in terminals, etc.
7. Fire protection and sprinkler system, piping and heads.
8. Structural.
9. Electrical Equipment Room layouts.
10. Environmental Rooms and associated refrigeration/heating systems.
11. Partition/room layout.
12. Ceiling tile and grid.
13. Access panels.
14. Smoke and fire dampers.
15. Roof-drain piping.
16. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
17. Above ceiling miscellaneous metal.
18. Heat tracing of piping.
19. Minimum access space requirements for all equipment for both installation and maintenance.

1.12 REGULATIONS, CODES, PERMITS AND FEES

- A. Conform to all rules, regulations, standards, ordinances and laws of local, state, and Federal governments.
- B. Prior to commencement of work, notify Commissioner as required and submit all of the applicable notifications for construction, operation and demolition. Secure required permits and inspections from NYC Dept. of Buildings, Dept. of Environmental Protection, Dept. Transportation of for this work and pay for all fees required for permits, inspections and review, including special agency construction.
- C. Include all utility and local building department charges for providing temporary and permanent water, sewer, and gas services to buildings.
- D. Provide Commissioner, NYC Dept. of Building access to work at all times.
- E. Contractor will be responsible for all law violations caused by the work under this Division. Notify Commissioner in writing when a discrepancy occurs between code requirements and work shown on drawings and resolve matter before proceeding with work.
- F. When requirements cited in this specification conflict with each other or with Contract Documents, most stringent will govern work.
- G. Make corrections in the work as required by the Commissioner to pass local regulations.
- H. Deliver to the Commissioner any and all final certificates of inspections, permits, and approvals.
- I. Make all necessary submissions to the Department of Environmental Protection, Bureau of Air Resources and Management, NYC Dept. of Buildings, Fire Dept of New York Department,



NYC Dept. of Traffic and NYC Dept. of Parks and Recreation, Pay all required fees for review, registration and sign off.

1.13 OPERATING AND MAINTENENACE MANUALS

- A. General: Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of filed assembled units, including as-built wiring diagrams. Manual will contain names and addresses of manufacturers and local representatives who stock or furnish or repair parts for items or equipment. Divide manuals into three sections or books as follows:
1. Directions for and sequence of operation for each item of the Mechanical and Electrical systems; e.g., air handling units, boilers, chillers, domestic water pump, generator, etc. Sequence must list valves, switches, and other devices used to start, stop and control system. Detail procedure to be followed in case of malfunctions. Include detailed approved flow diagrams of temperature control, heating, condensate, chilled water, condenser water, etc. as appropriate for systems provided. Include approved valve directory showing each valve number, location of each valve, and equipment or fixture controlled by valve. The section must contain as a minimum, but not limited to the following items:
 - a. Startup & shutdown procedures: Provide a step-by-step write-up and video of all major equipment. When manufacturer's printed start-up, troubleshooting and shutdown procedures are available; they must be incorporated into the operating manual for reference.
 - b. Operating Instructions: Written operating instructions and instructional videos will be included for the efficient and safe operation of all equipment.
 - c. Equipment List: List of all major equipment as installed must include model number, capacities, nameplate data and manufacturer's location and purchase order information.
 - d. Service Instructions: Provide the following information for all pieces of equipment:
 - 1) Recommended spare parts, including catalog number and the name, address and telephone number of local suppliers of factory representative.
 - 2) Lubrication and maintenance instructions for all equipment including all electric motors.
 - 3) Belt sizes, types and lengths.
 - e. Detailed list of all control set points and control and wiring diagrams and software.
 - f. Testing and Commissioning Sheets detailing all set points, balance figures for air and water systems and results of noise tests.
 - g. Include in the manuals, parts catalogs for each item of equipment furnished by the Contractor with the components identified by number of for replacement ordering.
 - h. Where applicable, provide type written instructions set in a glass frame.
 - i. All as-built drawings and wiring diagrams.
 - j. Valve charts organized on a room and sequence basis, detailing room, system and valve numbers.
 - k. Manual damper charts organized on a room and system basis, detailing room system and damper number.
 - l. Typewritten detailed description of sequence of operation of each system, with charts and diagrams.



- m. Provide control diagrams, for each air and hydronic system. Diagrams must show complete equipment, controls, model numbers, etc., marked to correspond to identification on equipment.
 - n. Letters from manufacturers certifying their supervision of equipment installation and startup procedures.
 - o. Machinery vibration test reports.
 - p. Certificates of sterilization/chlorination of plumbing systems.
 - q. Test certificates.
 - r. Instruction certificates.
2. Detailed maintenance and trouble shooting manuals furnished by manufacturer for complete maintenance. Include copy of performance, tests and balancing reports.
 3. Lubrication instructions detailing type of lubricant, amount and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first class lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.
 - a. A lubrication chart listing each item of equipment, all points of lubrication, proper lubricant, dates lubricated, and lubrication schedule.
 4. Diagrams and Charts
 - a. One copy of each valve chart, damper chart, and lubrication chart will be mounted under glass and installed at locations to be selected by the Commissioner.
 - b. Provide control diagrams, for each air and hydronic system, suitably framed, with glass front. Diagrams must show complete equipment, controls, model numbers, etc., marked to correspond to identification on equipment. Locate as directed by Commissioner.
 - c. Air and water flow diagrams.
- B. Furnish copies of manuals to Commissioner. Deliver manuals no less than 30 days prior to acceptance of equipment to permit Commissioner's designated personnel to become familiar with equipment and operation prior to acceptance.
- C. Provide framed and glazed charts as follows:
1. Flow diagrams from first part of manual as described above.
 2. Valve directory.
 3. Lubrication, valve and damper chart from third part of manual.
- D. Operating Instructions: Upon completion of installation or when the Commissioner accepts portions of building and equipment for operational use, instruct the City of New York's operating personnel in any or all parts of all systems. Instructions must be performed by factory instructed personnel. Commissioner will determine which systems may require additional instructions. Duration of instruction must take equipment through complete cycle of operation (at least 7 days). Make adjustments under operating conditions.
- E. Protection of work:
1. Contractor is responsible for the work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.



1.14 FIELD ADJUSTMENTS TO AIR HANDLING EQUIPMENT, FANS AND PUMPS

- A. Contractor is responsible for changing or adjusting belts, drives, pulleys, motors, impellers, etc., as required, by adjustment for acoustic performance, and by balancing company to achieve the desired air and water delivery by all air handling equipment and pumps.

1.15 COOPERATION BETWEEN TRADES

- A. Cooperate with all other Divisions performing work on this project as necessary to achieve a complete neatly fitted installation for each condition. Consult the Drawings and Specifications to determine nature and extent of work specified in other Divisions that adjoins or attaches to the work of this Division. Confer with other Divisions at the site to coordinate this work with theirs in view of job conditions to the end that interferences may be eliminated and that maximum head room and clearance may be obtained. In the event that interferences develop, the Commissioner's decision will be final as to which Division will relocate its work, and no additional compensation will be allowed for the moving of piping, ductwork, conduit, or equipment, to clear such interferences. Provide templates, information, and instructions to other divisions to properly locate holes and openings to be cut or provided.
- B. For Testing and Balancing of the system, ensure full co-ordination with all other Trades to achieve access to all system components, including leaving wall/ceiling sections down for access. Contractor will be responsible for pre-balancing checks and check sheet and responsibilities outlined in Section 230593.
- C. Ensure full co-ordination between trades to ensure the system is commissioned in accordance with the complete requirements of the complete contract documents.

1.16 HOIST, RIGGING, TRANSPORTATION AND SCAFFOLDING

- A. Provide all scaffolding, staging, cribbing, tackle hoist and rigging necessary for placing all materials and equipment in their proper places in the Project. All temporary work will be removed from the premises when its use is no longer required.

1.17 PRODUCT, DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations. Provide protective coverings during construction.
- B. Identify materials and equipment delivered to Site to permit check against approved materials list, reviewed Shop Drawings.
- C. Completely cover motors and other moving machinery to protect from dirt and water during construction.
- D. Cap all openings in pipe and ductwork daily to protect against entry by foreign matter.
- E. Protect premises and Work of other Divisions from damage arising out of installation of Work of this Division.



- F. Perform Work in manner precluding unnecessary fire hazard.
- G. All ductwork must be delivered to site with all ends and openings capped with minimum of heavy gauge polyethylene sheeting taped all around to prevent ingress of moisture, dust, debris, etc.
- H. Protect from loss or damage. Replace lost or damaged materials and equipment with new at no increase in Contract Sum. Protect from damage, water, dust, etc., material, equipment and apparatus provided under this Division, both in storage and installed, until Notice of Completion has been filed. Provide temporary storage facilities for material and equipment. Material, equipment or apparatus damaged because of improper storage or protection will be rejected. Remove from Site and provide new, duplicate material, equipment or apparatus in replacement of that rejected.
- I. All stock piled conduit and piping must be placed on dunnage, and protected from weather and from entry of foreign material. All stored materials and equipment must be carefully inspected prior to installation and replaced with new material or equipment if found to be damaged, corroded, etc.

1.18 GUARANTEE AND 24-HOUR SERVICE

- A. Guarantee of the Work of this section will be for one year following the date of Substantial Completion.
- B. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Commissioner.
- C. Provide 24-hour service beginning on the date of substantial completion and lasting until the termination of guarantee period. Service will be at no cost to the City of New York.
- D. At end of guarantee period, transfer manufacturer's equipment and warranties still in force to the City of New York.
- E. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Commissioner's satisfaction, advise the Commissioner in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Commissioner will suggest course of action.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Equipment and materials must be as described in the respective Sections of Division 23 and Division 26 and as shown.
- B. Equipment specified by manufacturer's number will include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.



- C. Equipment, material damaged during transportation, installation, operation is considered as totally damaged. Replace with new. Variance from this permitted only with written acceptance.
- D. All items of materials in each category of equipment must be of one manufacturer.
- E. Material and Equipment–General Requirements:
 - 1. Material must be new.
 - 2. Testing agency labeled or with other identification wherever standards have been established.
 - 3. Comprised to render complete and operable systems; provide additional items needed to complete installation to realized design.
 - 4. Compatible with space allocated. Modifications necessary to adjust items to space limitations at Contractor's expense.
 - 5. Installed fully operating and without objectionable noise or vibration.

2.2 FLAME-SPREAD AND SMOKE-DEVELOPED PROPERTIES OF MATERIALS

- A. All materials and adhesives used throughout the mechanical systems must have a flame spread rating not over 25 without evidence of continued combustion and with a smoke-developed rating not higher than 50. Materials include but not limited to are insulation, acoustical lining, filter, ducts, flexible connections, jackets or coverings regardless of kind, etc. If such materials are to be applied with adhesives and the adhesives used must have a flame-spread rating not over 25 and a smoke developed rating not higher than 50.
- B. "Flame Spread Rating" and "Smoke Developed Rating" must be as determined by the "method of test of surface burning characteristics of building materials, NFPA no. 244, ASTM E84, Underwriters' Laboratories, Inc., Standard." Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)."

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 SPECIAL RESPONSIBILITIES

- A. Cooperate and coordinate with work of other Sections in executing work of this Section.
 - 1. Perform work such that progress of entire project including work of other Sections will not be interfered with or delayed.
 - 2. Provide information as requested on items furnished under this Section which will be installed under other Sections.
 - 3. Obtain detailed installation information from manufacturers of equipment provided under this section.
 - 4. Obtain final roughing dimensions or other information needed for complete installation of items furnished under other Sections.
 - 5. Keep fully informed as to shape, size and position of openings required for material or equipment to be provided under this and other Sections. Give full information so that



openings required by work of this Section may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provide sufficient information on proper time, provide cutting and patching or have same done, at own expense and to full satisfaction of Commissioner.

6. Provide information as requested as to sizes, number and locations of housekeeping pads necessary for floor mounted vibrating and rotating equipment provided under this Section.
7. Notify Commissioner of location and extent of existing piping, conduit, ductwork and equipment that interferes with new construction. In coordination with and with approval of Commissioner, relocate piping, ductwork and equipment to permit new work to be provided as required by Contract Documents. Remove non-functioning and abandoned piping, ductwork and equipment as directed by Commissioner. Dispose of or store items as requested by Commissioner.

B. Installation Only Items

1. Where contractor is required to install items which the Contractor does not purchase, the Contractor will coordinate delivery and be responsible for their unloading from delivery vehicles and for their safe handling and field storage up to time of installation. This Contractor will be responsible for:
 - a. Any necessary field assembly and internal connections, as well as mounting in place of the items, including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt to architectural and structural conditions.
 - b. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

C. Maintenance of equipment and systems: Maintain equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation, and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.

D. Use of premises: Use of premises will be restricted as directed by Commissioner and as required below:

1. Remove and dispose of dirt and debris and keep premises clean. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition and do cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Commissioner.
2. Store materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material must be kept off the ground by means of pallets or racks and covered with tarpaulins.
3. Do not interfere with function of existing sewers and water and gas mains, electrical or mechanical systems and services. Extreme care must be observed to prevent debris from entering pipe, ductwork and equipment. Confer with Commissioner as to disruption of services or other utilities due to testing, connection of new work to existing. Interruption of services must be performed at time of day or night deemed by Commissioner to provide minimal interference with normal operation. Obtain Commissioner's approval of the method proposed for minimizing service interruption.

E. Surveys and Measurements:



1. Base measurements, both horizontal and vertical, on reference points established by Contractor and be responsible for correct laying out of work.
2. In event of discrepancy between actual measurements and those indicated, notify Commissioner in writing and do not proceed with work until written instructions have been issued by Commissioner.

F. Fireproofing:

1. Clip, hangers, clamps, supports and other attachments to surfaces to be fireproofed must be installed, insofar as possible prior to start of spray fiber work.
2. Ducts, piping and other items which would interfere with proper application of fireproofing must be installed after completion of spray fiber work.
3. Patching and restoring of fireproofing due to cutting or damaging to fireproofing during course of work specified under this section must be performed by installer of fireproofing and must not constitute grounds for an extra cost to City of New York.

G. Temporary Utilities:

1. Coordinate work under this Section with progress of construction so that permanent heating system will be ready for temporary heating if permitted by Commissioner as soon as the building is closed in.
2. Provide and direct labor required for attendance, operation and final restoration of permanent heating system if used for temporary heating purposes. Continuous direct attendance must be provided whenever permanent system is in operation prior to acceptance of permanent heating system by Commissioner.

H. Air bound Systems: If, after the plant is in operation, any piping systems, coils or other apparatus are stratified or air bound (by vacuum or pressure), they will be re-piped with new approved and necessary fittings, air vents, or vacuum breakers at no extra cost. If connections are concealed in furring, floors or ceilings, this trade will bear the cost of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.

I. Miscellaneous: Unload materials and equipment delivered to site. Pay cost for rigging, hoisting, lowering and moving electrical equipment on and around site, in building or on roof.

3.3 MATERIALS AND WORKMANSHIP

- A. Work will be neat and rectilinear. Ductwork, piping, conduit, etc. will run concealed except in mechanical rooms and areas where no hung ceiling exists. Install material and equipment as required by manufacturers. Installation must operate safely and without leakage, undue wear, noise, vibration, corrosion or water hammer. Work must be properly and effectively protected, and pipe and duct openings will be temporarily closed to prevent obstruction and damage before completion.
- B. Except as specified otherwise, material and equipment must be new. Provide supplies, appliances and connections necessary for complete and operational installation. Provide components required or recommended by OSHA and applicable NFPA documents.
- C. Finish of materials, components and equipment will be as approved by Commissioner and will be resistant to corrosion and weather as necessary.



3.4 CONTINUITY OF SERVICES

- A. Do not interrupt existing services without Commissioner’s approval.
- B. Schedule interruptions in advance, according to Commissioner’s instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.
- C. Interruptions must be scheduled at such times of day and work so that they have minimal impact to City of New York’s operations.
- D. Contractor must coordinate any shutdowns of existing systems as follows:
 - 1. Give proper notice to Commissioner when making shutdowns; a minimum of fourteen full days are required.
 - 2. Minimize shutdowns of any system.
 - 3. Provide temporary services where required and perform shutdown and tie-ins at a time convenient to Commissioner.
 - 4. Contractor will be responsible for completing and filing Commissioner’s shutdown notice questionnaire.
 - 5. Perform required survey and inspection work required by the notice for shutdown.

3.5 WELDING

- A. Weld only by approved acetylene or electric welding process.
- B. Conduct tests to demonstrate suitability of procedures to be used in making welds which conform to specified requirements.
- C. Specification for welding procedure must meet requirements of Welding Qualifications, Section IX, ASME Boiler and Pressure Vessel Code and ANSI B31.1.
- D. Align components. No strain must be imposed on component parts during welding. No part of pipe must be offset more than 20% of thickness. Set flanges and branches properly.
- E. Welder qualification:
 - 1. Test welders to demonstrate ability to make acceptable welds. Tests conducted for qualification of welder for work under one Division or Section will not qualify welder for work under another Division or Section.
 - 2. Tests will be as prescribed for welder qualification in Section IX of the ASME Code.
 - 3. Records of such tests will be as follows: Each welder will be assigned an identifying number, letter or symbol. Identifying mark will be stamped adjacent to welds made by this welder. Identification will be at top of horizontal piping and at front of vertical piping.
 - 4. Maintain record of welders employed, showing dates and results of tests and identifying mark assigned to each welder. Certify records and make them accessible to the Commissioner. Before completion of project, one copy of records must be turned over to Commissioner.
 - 5. No qualification must be older than three years when welder commences to work on this project. If the welder has not welded in required welding process for a period of six months, the welder must be re-certified.



- F. Welding Tests
1. As designated by Commissioner, remove welds for destructive testing or for testing by non-destructive means.
 2. If, in Commissioners opinion, welds so tested do not meet requirements of Sections VIII and IX of ASME, then the contractor will pay for costs of the tests. Remove welds welded by that welder at no cost to the City of New York. Rewelding must be performed by qualified welder other than welder whose weld did not pass the test. Welders whose welds were defective must not be employed on site for remainder of the project.
 3. Welding of stanchions, brackets, anchors and other welding not performed on pipe joints must be in accordance with requirements of AWS specifications and requirements.

3.6 ACCESS AND ACCESS PANELS

- A. Access panels must be provided where indicated on drawings. Include allowance for 24x24 access panels in sheetrock ceilings for ceiling mounted equipment.
- B. Provide proper access to materials and equipment that require inspection, replacement, repair or service, and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Commissioner as to the best method of approach for minimizing effect of reduced access which may result.
- C. Coordinate and prepare a location, size, and function schedule of access panels required to fully service equipment and deliver to a representative of installing Trade. Furnish and install distinctively colored buttons (color as selected by Commissioner) in finished ceiling to identify all access panels.
- D. Furnish access panels for installation under other Sections where fire dampers, volume dampers, controls, shut-off valves, control valves, check valves, or other items installed under this section require access and are concealed in floor, wall, furred space or above ceiling. Access panels may be by Milcor, Knapp, Nystorm, Inlanf Steel or approved equal; coordinate selection with other Section supplying similar access panels
- E. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters, or test hole openings above ceiling must have location marked with thumb tack on finished ceiling panel. Location must be noted on record drawings.
- F. Access panels must have same fire rating classification as surface penetrated.
- G. Panels will be at least 8"x8"; access panels at equipment (valves, fire dampers).

3.7 PENETRATIONS AND SLEEVES

- A. General
1. Layout penetration and sleeve openings in advance to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.
 2. Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on grade), partitions and floors. Sleeves must meet NFPA 101 requirements and material requirements of these specifications.



3. Sleeves that penetrate outside walls, basement slabs, footings and beams must be waterproof.
 4. Coordinate work carefully with architectural and structural. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetration of existing construction. Do not penetrate structural members without Commissioner's approval.
 5. Sleeves for insulated pipe and duct in no-fire rated construction must accommodate continuous insulation without compression. Sleeves and/or penetration in fire rated construction must be packed with fire rated material which must maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted.
 6. Where pipes, etc. passing through openings are exposed in finished rooms, finishes of filling materials must match and be flush with adjoining floor, ceiling, and wall finishes.
 7. Identify unused sleeves and slots for future installation.
 8. Fill slots, sleeves and other openings in floors and walls not used. Fill spaces in openings after installation of pipe, duct, conduit or cable.
 9. Fill for floor penetration must prevent passage of water, smoke, fire, and fumes. Fill must be fire resistant in fire floors and walls, and must prevent passage of air, smoke and fumes.
 10. Sleeves through floors must be watertight and must extend 2" above floor surface.
- B. Pipe and Conduit Sleeves:
1. Annular space between pipe/conduit and sleeve must be at least ¼".
 2. Sleeves are not required for slabs-on-grade unless otherwise noted on plans.
 3. Sleeves and packing materials, through rated firewalls and smoke partitions must maintain fire rating of construction penetrated.
 4. Do not support piping risers or conduit on sleeves.
- C. Duct Sleeves and Prepared Openings:
1. Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger and for square, rectangular and flat oval ducts, except as otherwise specified otherwise. Sleeves must meet SMACNA requirements.
 2. Provide sleeves for ducts through 1-, 2- or 3- hour fire rated construction and smoke partitions, regardless of size or shape of ducts. Sleeves must maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances must meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.
 3. Prepared openings must be framed to provide 1" clearance between framing and duct or duct insulation.
- D. Installations, Testing and Approvals:
1. Installation must meet manufacturer's recommendations exactly, particularly regards to safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire rated construction.
 2. Sleeve penetration methods must be water- and gas- tight and must meet requirements of ASTM 119 Standard Methods of Fire Tests of Building Construction and Materials.



3. Fire-stop penetration seal methods and materials must be FM-approved and UL-listed as applicable. They must have same rating as the structure penetrated. Submit manufacturer's detail sheet indicating assembly rating.
4. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

3.8 ANCHORS AND INSERTS

- A. Inserts will be iron or steel of type to receive machine bolt head or nut after installation. Insert must permit adjustment of bolt in one horizontal direction and must develop strength of bolt when installed in properly cured concrete.
- B. Provide anchors as necessary for attachment of equipment support and hangers.

3.9 ESCUTCHEONS

- A. Install escutcheons around exposed pipe passing through finished floor, floor, wall, or ceiling. Escutcheons must be heavy cast brass, chromium plated, adjustable, and of sufficient outside diameter to cover sleeve opening and must fit snugly around pipe and flush against floor or wall surface. Escutcheon plates must be provided on pipes at fixtures and must be polished chrome plated. Plated steel escutcheon plates are not acceptable. Sample escutcheon plates must be submitted to the Commissioner for approval prior to installation.

3.10 CORE DRILLING

- A. Core drilling is to be avoided.
- B. Set sleeves prior to installation of structure for passage of pipes, conduits, ducts, etc.
- C. Where core drilling is unavoidable, or required by renovation projects, locate all required openings prior to coring and submit to Commissioner for review.
- D. Coordinate openings with Contractor and all other trades.
- E. All core drilling locations will be approved by the Commissioner.
- F. Do not disturb existing systems.
- G. Thoroughly investigate existing conditions in vicinity of required opening prior to coring.

3.11 CARPENTRY, CUTTING AND PATCHING

- A. Do not cut or drill structural members without consent of Commissioner.

3.12 EXCAVATING & BACKFILLING

- A. Preparation:
 1. In accordance with the requirements of Division 31.
 2. Provide barricades, signs, lanterns, shoring, sheeting and pumping as part of Work in this Division as required to ensure safe conditions.



3. Dig trenches straight, true to line and grade with sides and bottoms smoothed of any rock points. Excavate 6 inches below grade of pipe, fill with sand properly packed. Support pipe for entire length on packed sand. Shape or pack bottom of trenches for pipe, duct fittings, hubs, couplings, etc., using templates to fit outside periphery of lower third of piping and ductwork. Provide piping outside building with 36 inch minimum cover from top of pipe to finished grade. Minimum width 26 inches.
4. Dispose of all surplus excavation material and seepage water as directed.
5. After piping has been installed, tested and approved, backfill all excavation, tamp and compact by compressed air tampers.
6. Backfill to 6 inches above crown of pipe with unwashed sand, with remainder of trench backfilled and mechanically tamped in 6-inch maximum layers of selected excavated materials, free from organic matter, rocks, etc. Provide 90 percent compaction in accordance with ASTM D 1557-58T; 95 percent compaction for trenches below building slabs.
7. In any asphalt or concrete paved areas, backfill only to subgrade level.
8. When piping is installed, and prior to backfilling, advise Commissioner. Do not backfill without acceptances of Commissioner.
9. Replace to original condition all paving, curbs, gutters, walks, etc., which become disturbed by trenching.

3.13 CUTTING AND RESTORATIONS

- A. Assume responsibility for restoration to any part of premises or Work of other Divisions, caused by leaks or breaks in piping or equipment furnished or installed under this Division during construction and guarantee period.

3.14 VIBRATION CONTROL

- A. Design criteria for all the specified in Section 23 05 48- "Vibration and Seismic Control for HVAC".

3.15 CONCRETE EQUIPMENT BASES

- A. Locate and size concrete base for all equipment located on existing floors. Base: Six inches high and extending six inches beyond edge of equipment base unless indicated otherwise. Contractor must ensure equipment elevation is suitable for gravity drainage where relevant.
- B. Coordinate concrete bases; concrete is specified in Division 3.

3.16 WATERPROOF CONSTRUCTION

- A. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashing at exterior wall and roof penetrations. Caulk watertight penetrations of foundation walls and floors. Provide membrane clamps at penetrations of waterproof membranes.
- B. Provide galvanized sheet metal weather protection canopies, hoods or enclosures over all out-of-doors equipment, the operation or maintenance of which would be impaired by rainwater. This requirement applies to damper operators and bearing, damper motors, controls, and instruments. See other sections in this Division for application of this requirement to motors, drive, ducts, and fans.



3.17 RESTORATION OF DAMAGE

- A. Repair or replace, as directed by Commissioner, materials and parts of premises which become damaged as result of installation of Work of this Division. Remove replaced parts from premises.

3.18 LINTELS

- A. Where openings break into an already completed wall as a result of a failure to set sleeves or provide openings during erection of the wall, the Contractor must provide lintels as required for the support of building construction above the inserted item.
- B. Lintels must be structural steel angles, channels or tees of proper size and sections for the supported load; submit to the Commissioner with supporting calculations for approval prior to the installation.
- C. Where new openings are required in an existing wall co-ordinate opening size, location and lintel type with Commissioner.

3.19 ROOF OPENINGS AND CURBS

- A. Roof openings where required must be coordinated with all affected Trades and all flashing and patching must be as per details indicated on the Architectural plans.

3.20 TOOLS AND EQUIPMENT

- A. Furnish all tools and equipment necessary for the proper installation, protection and upkeep of the Work.

3.21 ADJUSTMENT

- A. Preliminary Operation:
 - 1. Operate any portion of installation for City of New York's convenience if so requested by Commissioner. Such operation does not constitute acceptance of Work as complete.
- B. Startup Service:
 - 1. Prior to startup, ensure that systems are ready, including checking the following: proper equipment rotation, proper wiring, auxiliary connections, lubrications, venting fan balance, controls and installed and properly set relief and safety valves.
- C. Start and operate all systems. Provide services of factory instructed technicians for startup of major equipment and systems including chillers, boilers, pumps, air handling units, etc.
- D. Adjusting:
 - 1. Adjust all equipment and system components as shown or as otherwise required to result in intended system operation.



2. Thereafter, as a result of system operation or as directed by Commissioner, make readjustments as necessary to refine performance and to effect complete system "tune-up".
3. After completion of testing and adjustment, operate the different systems and equipment under normal working conditions for 72 hours continuously and show specified performance. If, in the opinion of the Commissioner, performance of equipment or systems is not in accordance with specifications or submitted data, alter or replace equipment at no increase in Contract Sum. Contractor, at own option, may order tests from an independent approved laboratory to prove compliance. All such tests must be at no increase in Contract Sum. Repeat process as often as required.
4. At completion of Work, provide written certification that all systems are functioning properly without defects.

E. Noise:

1. Cooperate in reducing any objectionable noise or vibration caused by mechanical systems to the extent of adjustments to specified and installed equipment and appurtenances.
2. Cooperate in adjustment of mechanical systems and terminal devices, as directed by Commissioner, to obtain specified acoustic properties.
3. Completely correct noise problems caused by failure to make installation in accordance with Contract Documents, including labor and materials required as a result of such failure, at no increase in Contract Sum. Includes refinish walls, floors etc.

3.22 INSTALLATION OF EQUIPMENT

- A. Use printed descriptions, specifications and recommendations of manufacturers as a guide for installation of Work.
- B. Assemble equipment required to be field assembled under the direct supervision of the manufacturers' agent. Prior to the final acceptance submit letters from the manufacturers that this has been done.
- C. Avoid interference with structure and with work of other trades, preserving adequate headroom and clearing doors and passageways, to satisfaction of Commissioner and in accordance with code requirements. Installation must permit clearance for access to equipment for repair, servicing and replacement.
- D. Install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof mounted equipment must be installed and supported on structural steel provided under other Sections.
- E. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall or ceiling mounting of equipment as required.
- F. Provide steel supports and hardware for proper installation of hangers, anchors, guides, etc.
- G. Provide cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installations.



- H. Structural steel and hardware must conform to Standard specifications of ASTM; use of steel and hardware must conform to requirements of Section V of Code of Practice of American Institute of Steel Construction.
- I. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly, which will void warrantee. Report in writing to Commissioner, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

3.23 ELECTRICAL REQUIREMENTS

- A. Electrical Work in this Division must conform to requirements of Division 26.
- B. Furnish all motors, starters, variable frequency drives, disconnects for motors and heating coils and controls for equipment unless otherwise noted.
- C. Coordinate with Division 26 to install all starters, variable frequency drives, disconnects and overload protectors and provide all necessary wire, conduit and boxes to properly connect equipment no matter how many disconnects, starters, etc are included, unless otherwise noted. Contractor must receive, unload, set and install motor starters, disconnects and other items under Division 26.
- D. Provide all necessary conduit and control wiring to pushbuttons, thermostats, pilot lights, interlocks and similar equipment for equipment under Division.
- E. Flow control switches, thermostats, controllers, relays, transformers, switches, etc and other components provided with equipment shown on the Contract Documents not to be factory wired or part of division 26 scope necessary for proper operation of mechanical systems must be furnished and installed by Contractor.
- F. Where the starter and/or safety switch is an integral part of equipment assembly, the assembly must be furnished with the wiring complete between starter, controller and motor. Make connections to unit terminals.
- G. Factory wired assemblies and panels: Pre-wired to numbered terminal strips for connection to field wiring. Provide disconnect switch for each control circuit connection to pre-wired assemblies and control panels.
- H. All motors and motor control equipment must meet the requirements of NEC, and must comply with requirements of the Public Utility Company furnishing service and NY City Electrical Code.
- I. Verify voltage at site before ordering any electrical equipment.
- J. Wiring:
 - 1. Power wiring: Except for factory wiring on mechanical equipment, power wiring is specified in Division 26.
 - 2. HVAC control wiring:
 - a. Except for factory wiring on mechanical equipment, specified in Division 26.



- b. All wiring and conduit must be according to latest edition of the NEC. All control wiring must be installed in EMT in accordance with applicable portions of NEC and requirements of Division 26.
 - c. Low voltage wiring in air plenums must be UL approved conductor for application as manufactured by Alpha, Beldon, Weico or approved equal..
 - 3. Fire protection system wiring: See Division 26.
 - 4. Provide approved wiring diagrams for work to be connected under Division 26.
- K. Provide weatherproof devices and installation for out-of-doors work.
- L. Smoke detectors: Product of combustion detectors in ductwork furnished under Division 26, installed by this Division 23, and wired by Division 26 to fire alarm system.
- M. Motors:
- 1. Provide motors for equipment specified. Separately shipped motors are to be installed by Division 23. Coordinate with Division 26.
 - 2. Separately shipped motors and variable frequency drives must be received unloaded installed by Division 23, wired by Division 26 Adjustable motor bases and all bolts and nuts required for installation of base and motor must be provided and installed by Division 23.
 - 3. Align and adjust mechanical coupling for direct-driven motorized equipment. Adjust and align drive and belt tension on belt-driven equipment.
 - 4. Field lubricate all motors prior to operation and maintain lubrication prior to acceptance of equipment by the Commissioner.
 - 5. Provide motor terminal connection diagram as prepared by motor manufacturers.
 - 6. Contractor will be responsible for proper rotation of three phase equipment.

3.24 PAINTING

- A. Equipment installed must have shop coat of non-lead gray paint. Hangers and supports must have one coat of non-lead primer. Machinery such as pumps, fans, etc., must be stenciled with equipment name. Stencil must be at least 6” high for large equipment, 2” high for small equipment. Finish painting, including painting of various piping and duct systems, will be coordinated with Section 09 90 00 - Painting and Coating.
- B. Paint all outside exposed equipment and equipment supports with two coats of weather resistant enamel.
- C. Provide heat resistant paint for hot piping, equipment and materials.
- D. Note requirement for Commissioner’s approval invoked under Article 3.3 MATERIALS AND WORKMANSHIP regarding finish of material and equipment, which are visible or subject to corrosive or atmospheric conditions.
- E. Properly prepare Work under this Division to be finish painted under Division 9.

3.25 LUBRICATION

- A. Lubricate all equipment at completion of Work. Furnish Commissioner with a written lubrication schedule for all equipment as specified in Division 23.



3.26 EXPANSION PROVISIONS

- A. Installation of piping must allow for expansion using offsets, loops, swing joints, expansion joints, etc. as necessary to prevent undue strain. Take-offs from mains to run outs must not have less than three elbow swing.
- B. Mains and risers with loops or offsets must be securely anchored to structure so as to impart expansion towards loops or offsets. Anchors must be constructed of heavy forged wrought iron, secured to pipe and to structure. Provide vibration isolation as required.
- C. Provide pipe alignment guides as required to guide expanding pipe to move freely from anchor points toward expansion joints, offsets, etc.

3.27 CLEANING

- A. Cleaning must be performed prior to commissioning.
- B. Completely cover all plumbing fixtures and all motors and other moving machinery to prevent entry of dirt and water during construction. Effectively cap all openings into ducts and pipes to keep foreign matter out during construction.
- C. Protect all finished surfaces of fixtures with heavy paper pasted thereon, or by other means, throughout the period of construction.
- D. Ductwork:
 - 1. Ducts must be thoroughly cleaned so that no dirt or dust must be discharged from diffusers, registers or grilles, when system is operated.
 - 2. Provide temporary connections for cleaning. Provide cheesecloth for openings during cleaning.
 - 3. Replace filters prior to final inspection and testing.
- E. Piping
 - 1. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean pipe.
 - 2. Permanently install necessary chemical injection fittings complete with stop valves.
 - 3. After all piping systems have been pressure tested and approved for tightness, clean and flush piping as specified and as required by codes.
 - 4. Maintain continuous blowdown and make-up, as required during flushing operation.
- F. Equipment
 - 1. After completion of project, clean exterior surface of all equipment, including concrete residue, dirt, paint residue, etc.
 - 2. Plumbing fixtures - clean and polish fixtures immediately prior to final inspection.

3.28 FINAL INSPECTION

- A. As the work nears completion, review the requirements of the Contract Documents, inspect the work and inform all parties involved in work to be corrected or completed before the project can be deemed substantially complete.



- B. When the Project is substantially complete, notify Commissioner in writing of this fact, listing those items of Work remaining incomplete, the reason therefore, and the anticipated date that all remaining work will be completed. Carry out own final inspection and satisfy the Work. The Commissioner will then schedule final inspection of the Project.
- C. The Commissioner reserves the right to cancel and reschedule the inspection in the event substantial amount of work remains to be completed or corrected than indicated in the written request for inspection.
- D. All items not completed or found not complying with drawings or specifications by the Commissioner will be identified in their inspection report.
- E. Correct all items on inspection report. Make the correction and initial and date each item on the report after corrections have been completed.

3.29 PROJECT CLOSE-OUT PROCEDURE

- A. Review requirements of each section of the specifications and submit for approval to Commissioner the sign-off forms which must become the project close-out checklist. The Commissioner may incorporate additional specific items to the following checklist which must become part of project requirements.

END OF SECTION 23 05 00

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. General requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 SUBMITTALS

- A. Submittal Procedures: Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

1.5 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.

- B. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, in compliance with Energy Conservation Code of NYS, latest edition.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Rotor: Random-wound, squirrel cage.
- F. Bearings: Re-greasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- G. Temperature Rise: Match insulation rating.
- H. Insulation: Class F.
- I. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.



1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp may be one of the following, to suit starting torque and requirements of specific motor application:
 1. Permanent-split capacitor.
 2. Split phase.
 3. Capacitor start, inductor run.
 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Pre-lubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device must automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 23 05 13

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SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Fastener systems.
 - 2. Equipment supports.

1.3 PERFORMANCE REQUIREMENTS

- A. Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer licensed in State of NY, using performance requirements and design criteria indicated.
 - 1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Show fabrication and installation details for the following; include Product Data for components:
 - 1. Equipment supports.
- D. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.



PART 2 - PRODUCTS

2.1 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used. These fasteners may be used with prior written approval from Commissioner.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless- steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.2 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.3 ROOF PIPE SUPPORTS

- A. A pipe support with "strut" used to support roof-mounted electrical conduit, condensate piping, gas pipes, and other mechanical piping. Unique design absorbs thermal expansion and contraction of pipes thus preventing damage to the roof membrane. The base is gently rounded to allow movement upon the roof to prevent gouging the roof membrane. Pipes rest on a strut system which is made of hot-dip galvanized steel. The pipe support base is made of polycarbonate resin, and all other metal parts are made of hot-dip galvanized or stainless steel. Pipe stand will accommodate up to 2 1/2" pipe (inside diameter) or up to 3" (outside diameter) pipes.
- B. Provide deck plate beneath pipe stand. The deck plate is a rigid plate which supports other mechanical devices, pedestals or pipe supports by providing a flat smooth surface upon which supporting devices may rest to protect roof-top membranes and to further distribute roof top weight to protect sub-membrane insulation and decking material. The design of the deck plate allows rooftop pipe supports, pedestals and other supporting devices to be installed without penetrating the roof membrane and further allows the daily movement of a piping system to properly carry the load being borne by the supporting devices as thermal expansion and contraction moves the roof system of pipes or devices supported by the deck plate. The deck plate must be constructed of 16, 18 or 20 gauge stainless steel plate which prevents rusting, enhances the longevity of the roof, and provides maximum operational efficiency for other rooftop pipe stands, pedestals and support devices.

2.4 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS



- A. Refer to DDC General Conditions for execution requirements.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- C. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- E. Install lateral bracing with pipe hangers and supports to prevent swaying.
- F. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- G. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.



4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1 inch.

3.6 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to restore and comply with ASTM A 780.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- B. Use mechanical-expansion anchors instead of building attachments where required in concrete construction. Use of powder actuated anchors must be confirmed with Commissioner.

END OF SECTION 23 05 29

SECTION 23 05 48

VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Isolation pads.
 - 2. Isolated Roof Curb
 - 3. Spring and Neoprene Hangers

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: For each product indicated.
- C. Engineering Services: For vibration isolation and seismic-restraint calculations and details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the professional engineer licensed in the State of New York responsible for their preparation.
- D. Welding certificates
- E. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Kinetics Noise Control.



2. Mason Industries.
 3. Vibration Eliminator Co., Inc.
 4. Vibration Mountings & Controls, Inc.
 5. Or Approved Equal
- B. Pads (MWP): Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
1. Resilient Material: Oil- and water-resistant neoprene.
- C. Spring Isolators (SI): Freestanding, steel, open-spring isolators.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
- D. Elastomeric Hangers (NH): Double-deflection type, fitted with molded, oil-resistant elastomeric isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.
1. The diameter of the clear hole in the hanger box must be at least 3/4 inch larger than the diameter of the hanger rod and permit the hanger rod to swing through a 30 degree arc. When installed, the hanger box must be allowed to rotate through a full 360 degrees without encountering any obstructions. Neoprene will be bridge-bearing quality with a maximum durometer (Shore A scale) of 50.
 2. Neoprene must be bridge-bearing quality with a maximum durometer (Shore A scale) of 50.
 3. Unless otherwise specified, the static deflection of NH hangers must be 0.25 inches with a strain not exceeding 12.5%.
- E. Spring Hangers (SPNH): Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.



6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS:

- A. Refer to DDC General Conditions for execution requirements.

3.2 VIBRATION-CONTROL DEVICE INSTALLATION

- A. Coordinate with general construction trade for installation of roof curbs, equipment supports, and roof penetrations.
- B. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- C. Drilled-in Anchors:
 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Locate and avoid pre-stressed tendons, electrical and telecommunications conduit, and gas lines.
 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors must be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
 5. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 1. Obtain Commissioner's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 2. Test to 90 percent of rated proof load of device.
 3. Measure isolator deflection.
 4. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- C. Prepare test and inspection reports.

3.4 HVAC VIBRATION-CONTROL SCHEDULE

A. As indicated below unless otherwise noted on plans:

Equipment Name & Tag	Location	Isolator Type	Base Type	Min Deflection
Rooftop AC Unit	Roof	Isolated Roof Curb	Steel Structure	2 inches static deflection minimum
Fans	Parking Garage	Spring & Neoprene Hanger, SPNH	Steel Structure	2 inches
Boiler	Mechanical Room	Metal Waffle Pad, MWP	Concrete	Deflection not exceeding 15% of thickness
Heat Pump Condensing Units	Roof	Metal Waffle Pad, MWP	Steel Structure	
Pumps P-1,2	Boiler Room	Elastomeric Hangers, NH	-	0.35 inch minimum

END OF SECTION 23 05 48



SECTION 23 05 50

NOISE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. A.The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Sound attenuating units.
 2. Duct lining
 3. Duct and pipe lagging.
 4. Ductwork enclosure for soundproofing
 5. Soundproofing of construction.
- B. Acoustic performance of equipment systems and air distribution devices:
1. It is the intent of this specification that noise levels from HVAC equipment (air-conditioning and/or ventilating equipment, ducts, grills, diffusers, fan coil units, pumps, etc.) will not exceed the Noise Criteria Curves (NC) described in Paragraph 3 of this Section. Noise Criteria Curves establish a one number rating for evaluating the acceptability of a sound pressure spectrum according to the average person's hearing. Noise Criteria Curves and their related sound pressure equivalents for each frequency as described in the 1987 ASHRAE Handbook Systems Volume.
 2. These NC levels should be used as a guide in the event of product substitutions and shop drawing modifications. The NC levels must also serve as a gauge by which the results of workmanship and care of installation will be judged from an acoustical standpoint, since a poor installation can lead to the generation of noise.
 3. Noise Criteria for occupied spaces and in particular Training Classroom, Open Office and Robot Shop for this project must be NC 30 or better due to mechanical equipment with anticipated 10dBA room noise attenuation.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Design Criteria:
1. Provide noise control to avoid excessive noise in the building due to the operation of machinery or equipment, or due to interconnected piping, ductwork or conduit.



- C. Acoustical Testing/Quality Assurance:
 - 1. The contractor must cooperate with regard to sound tests (ARI 575, ANSI S1.13) which may be conducted by the Commissioner.
 - 2. The contractor must notify the Commissioner of any changes which will affect the acoustical performance.

1.5 WORKMANSHIP

- A. Workmanship is critical in achieving the objective of noise control and it is critical that all noise control work must be installed in good workmanship like manner.

PART 2 - PRODUCTS

2.1 SOUND ATTENUATORS

- A. Galvanized steel casing and inner faces, all internal components must be spot-welded. Seams must be lock formed, mastic filled and be airtight.
- B. Filler material must be of inorganic mineral or glass fiber under a minimum 5% compression. Filler material must also be inert, vermin and moisture proof. Flame spread classification of 10-25, fuel contributed 0-15, smoke development 0-20, in accordance with NFPA 255, UL No. 723.
- C. Acoustical performance must be established by ASTM E-477-96 procedures. Dynamic insertion loss, air generated noise and aerodynamic performance test results, both in positive and negative flow, with pressure drop ratings must be supplied that meets or exceeds requirements established later in this Specification.
- D. Manufacturers:
 - 1. Industrial Acoustics Company
 - 2. Vibro-Acoustics
 - 3. United McGill Corporation
 - 4. Or Approved Equal.

2.2 SOUND-LININGS

- A. Acoustical performance must be established by ASTM C423-90 procedures. Sound Absorption Coefficients with Type "A" mounting per ASTM E795 must be supplied that meets or exceeds requirements established later in this Specification.
- B. Duct acoustical lining must be roll form, 1-1/2inch thick roll-form fiberglass insulation with a surface acrylic EPA registered anti-microbial coating that will not support biological growth, and meets ASTM G21 and G22 specifications as called out in the drawings or specifications.
- C. Duct lining must be adhered by minimum 50% covering of a fire retardant adhesive in combination with non-ferrous mechanical fasteners.
- D. All transverse and longitudinal abutting edges of duct lining must be sealed and lapped 3" with a heavy coat of adhesive.



- E. Provide metal nosing over transversely-oriented liner edges facing the air stream.
- F. Manufacturers:
 - 1. Owens-Corning Fiberglass Company
 - 2. Johns Manville Insulation Division
 - 3. CertainTeed Corporation
 - 4. Or Approved Equal.

2.3 DUCT AND PIPE LAGGING

- A. Acoustical performance must be established by ASTM E413 and E90 procedures. Insertion loss, Transmission loss and STC data must be supplied that meets or exceeds requirements established later in this Specification.
- B. Where indicated on the drawings, duct/pipe must be wrapped with a minimum 2" thick glass or mineral fiber blanket with a minimum 3.0 lb/ft³ density, and a mass loaded vinyl sheet covered with an aluminum foil jacket. Complete system must provide a minimum STC-23 as measured in an independent accredited acoustical laboratory in accordance with ASTM E90 and E413. Insertion Loss data indicating an IL Insertion Loss value of 25 at 500 Hz. must also be submitted.
- C. Manufactures:
 - 1. Kinetics Noise Control, Inc.
 - 2. Childers Products Company
 - 3. Acoustical Duct & Pipe Lag from Sound Seal, a division of United Process, Inc.
 - 4. Or Approved Equal.

2.4 SPLIT SEALS

- A. Split Seals consist of pipe halves with minimum 3/4"(20mm) thick neoprene sponge cemented to the inner faces. The seal must be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not in place prior to the construction of the building member. Seals must project a minimum of 1"(25mm) past either face of the wall. Where temperatures exceed 240°F (115°C), 10 lb. density fiberglass may be used in lieu of the sponge.
- B. Manufacturers:
 - 1. Seals must be Type SWS as manufactured by Mason Industries, Inc.
 - 2. Kinetics Noise Controls, Inc.
 - 3. United McGill Corporation
 - 4. Or Approved Equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 GENERAL:

- A. No electrical conduit, fixture, ceiling suspension wires or other elements of the building construction must be attached to or abutted against the duct and piping systems.
- B. Where ducts or piping penetrate walls, ceilings and floors of the occupied spaces, or ceiling void partitions or acoustically rated elements whether shown on the drawings or not, acoustically seal the penetration.
- C. Contain rough-in of piping within stud wall cavities no less than 1/4-inch from the plane of the studs and 1 inch from gypsum board or other wall sheathing.

3.3 SOUND PROOFING OF CONSTRUCTION

- A. Required for penetrations of ductwork, pipes, and conduits through walls, floors and ceilings of mechanical rooms, electrical rooms with transformers, IT rooms and, as well as those walls, floors, and ceilings indicated on the architectural drawings.
- B. The Contractor must ensure that the sound control performance of structures be maintained in accordance with the drawings and specifications. All penetrations must be installed in a manner that results in complete air tightness through structure. If a condition occurs where penetration of the structure by a duct, pipe, conduit, etc., is not shown clearly on the drawings (or described in the specifications), the Contractor must ask immediately for clarification of the method necessary to install the particular item.
- C. Penetrations of Single-Wythe Masonry and Concrete Constructions
 - 1. Ductwork:
 - a. Install a metal sleeve at the penetration. Size the sleeve to allow for 1" closed cell elastomeric lining and normal duct clearances. Line the sleeve with 1" thick elastomeric liner.
 - b. Install duct through lined sleeve and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
 - c. Do not rigidly secure duct to wall with angles.
 - 2. Pipe/Conduit diameter = 1" or larger:
 - a. Install a metal sleeve at the penetration. Size the sleeve to allow for 1/2" elastomeric insulation liner and normal pipe clearances. Line the sleeve with 1/2" thick elastomeric sheet insulation. Alternately use acoustic split seals.
 - b. Install pipe/conduit through lined sleeve and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
 - c. Do not rigidly secure pipe/conduit to wall with angles.
 - d. Provide flex connection on one side of seal if crossing acoustic joint.
 - 3. Pipe/Conduit diameter < 1":
 - a. Wrap pipe/conduit with 1/2" thick elastomeric pipe insulation. Extend wrapping a minimum of 2" beyond the width of the partition on either side.
 - b. Grout tightly to the elastomeric insulation on the pipe/conduit.
 - c. Trim insulation to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
- D. Penetrations of Single Stud Drywall Constructions



1. Ductwork:
 - a. Wrap with 1" thick elastomeric insulation. Extend wrapping a minimum of 2" beyond the width of the partition on either side.
 - b. Install drywall tight to the insulation wrap.
 - c. Trim insulation to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
2. Pipe diameter = 1" or larger:
 - a. Wrap with 1/2" thick elastomeric insulation. Extend wrapping a minimum of 2" beyond the width of the partition on either side.
 - b. Install a metal pipe sleeve around the insulation wrap.
 - c. Install the drywall around the sleeve and spackle tightly to full thickness of partition.
 - d. Trim insulation and sleeve to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
3. Pipe diameter < 1":
 - a. Wrap with 1/2" thick elastomeric insulation. Extend wrapping a minimum of 2" beyond the width of the partition on either side.
 - b. Install the drywall tight to the insulation wrap.
 - c. Trim insulation to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant if partition is fire-rated.
4. Multiple Duct/Pipe Penetrations
 - a. Where a series of duct, conduits or pipes are penetrating the wall/floor/ceiling, each duct/conduit/pipe must be separated by minimum 4" in all directions.
 - b. Multiple duct/pipe/conduit penetrations at one location (i.e., one large opening for a series of pipe runs) is not recommended.
5. Penetrations of Double-Wythe Masonry/Concrete and/or Double Stud Drywall and/or Combination Constructions
 - a. Use same techniques described above except do not bridge the two studs or wythes with solid members such as sleeves or stud frames. Each sleeve or frame must be separate for each individual wythe or stud.
6. Provide flex connections for duct / pipe on one side of seal if crossing acoustic joint.

3.4 DUCTWORK ENCLOSURE FOR SOUNDPROOFING

- A. Where indicated on drawings, duct must be enclosed on all four sides (or air-tight to the slab above) with a separate 2-1/2" steel stud filled with 2" thick, 3-pound density fiberglass and covered with 2 thicknesses of 5/8" thick gypsum wallboard. Wherever possible, joints between the base and face layers must be staggered by a minimum of 6 inches. All gypsum board joints on both the base and face layers must be taped. Use acoustical caulking to seal all interfaces with structure. Treatment must be applied to elbows, transitions, branch-takeoffs, etc. that are included in the applicable duct section.
- B. Where access is required, approved sheetrock covered metal access panels must be installed with perimeter gaskets.
- C. Where enclosure intersects a metal deck, ensure that the gypsum wallboard is cut to the shape of the flutes and caulked air-tight.



3.5 SOUND LININGS:

- A. Provide sound linings on all supply and return ductwork within mechanical rooms but not less than 15 ft (25ft) from each fan.
- B. Sound lined boots at return and exhaust registers.
- C. Provide sound linings minimum 10ft downstream of all terminal devices.

3.6 SERVICES PENETRATIONS

- A. Pipe and ductwork: Where pipe and ductwork penetrates acoustical partitions, provide acoustic seal around the piping and ductwork.
- B. Electrical Box Sealant: Backs of electrical boxes, light fittings etc., in acoustically rated constructions must be sealed airtight by sheet caulking.

3.7 SILENCER INSTALLATION

- A. Silencer manufacturer's basic installation requirements must not be compromised.
- B. Where silencers penetrate acoustical partitions, provide acoustic seal around the silencer.

3.8 ELECTRICAL CONNECTIONS:

- A. All isolated equipment to be connected with long lengths of flexible steel conduit from junction box, type depending on environment.

END OF SECTION 23 05 50



SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Duct labels.

1.3 SUBMITTAL

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 4. Fasteners: Stainless-steel rivets or self-tapping screws.
 - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:



1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White
 3. Background Color: Black
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule must be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Shop Drawing: Show location and mockup of labels for font, size, layout.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Red.
- D. Background Color: White.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- H. Fasteners: Stainless-steel rivets or self-tapping screws.
- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.



- J. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

2.4 DUCT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Refer to color schedule below.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulates.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; maintenance spaces such as shafts and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 25 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.
 - 7. Refrigerant piping label must also include unit identification
- B. Pipe Label Color Schedule:
 - 1. Refrigerant Piping:
 - a. Background Color: Orange
 - b. Letter Color: Black.

3.5 DUCT LABEL INSTALLATION

- A. Install plastic-laminated or self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:
 - 1. Black lettering on white background.
 - 2. ASME A13.1 Colors and Designs: For hazardous material exhaust.
- B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 25 feet in each space where ducts are exposed or concealed by removable ceiling system.

END OF SECTION 23 05 53



SECTION 23 05 93

TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems
 - a. Constant-volume air systems.
 - b. Modulating air systems
 - 2. Balancing Hydronic Piping Systems
 - a. Constant-flow hydronic systems.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Strategies Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- C. Certified TAB reports
- D. Post balancing reports indicated in Articles 3.13 and 3.14

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".



- B. TAB subcontractor Qualifications: Engage a TAB entity certified by AABC or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB subcontractor and certified by AABC or TABB.
 - 2. TAB Technician: Employee of the TAB subcontractor and who is certified by AABC or TABB as a TAB technician.
- C. Certify TAB field data reports and perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- D. TAB Report Forms: Use standard TAB contractor's forms approved by Commissioner or Commissioning Authority.
- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums a used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section 233113 "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.



2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
 - G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
 - H. Examine test reports specified in individual system and equipment Sections.
 - I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
 - J. Examine indoor equipment such as indoor AC units, ceiling hung fans and verify that they are accessible, clearance for filter pull, local disconnect switch and their controls are connected and functioning.
 - K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
 - L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
 - M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
 - N. Examine system pumps to ensure absence of entrained air in the suction piping.
 - O. Examine operating safety interlocks and controls on HVAC equipment.
 - P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.
- 3.3 PREPARATION
- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
 - B. Complete system-readiness checks and prepare reports. Verify the following:
 1. Permanent electrical-power wiring is complete.
 2. Hydronic systems are filled, clean, and free of air.
 3. Automatic temperature-control systems are operational.
 4. Equipment and duct access doors are securely closed.
 5. Balance, smoke, and fire dampers are open.
 6. Isolating and balancing valves are open and control valves are operational.
 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 8. Windows and doors can be closed so indicated conditions for system operations can be met.



3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section 230700 "HVAC Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Division 23 Section 233113 "Metal Ducts."



3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 - 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 - 5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 6. Obtain approval from Commissioner for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections 233416 and 238129 for air-handling units and fans for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit and fan performance.
 - 7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure airflow of sub-main and branch ducts.
 - a. Where sufficient space in sub-main and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 - 3. Re-measure each sub-main and branch duct after all have been adjusted. Continue to adjust sub-main and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
 - 1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.



- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
 - 1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 - 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR MODULATING AIR SYSTEMS

- A. The procedure applies to toilet, dryer and kitchen exhaust system
- B. Adjust fan and associated variable frequency drive to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
- C. Adjust pressure transducer set-point to maintain bathroom fans exhaust airflow within 10% of design flow at lowest possible pressure setting of the pressure transducers in coordination with factory trained technician.

3.8 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
 - 1. Open all manual valves for maximum flow.
 - 2. Check liquid level in expansion tank.
 - 3. Check makeup water-station pressure gage for adequate pressure for highest vent.
 - 4. Check flow-control valves for specified sequence of operation, and set at indicated flow.
 - 5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
 - 6. Set system controls so automatic valves are wide open to heat exchangers.
 - 7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
 - 8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.9 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

- A. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:
 - 1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.



- a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Commissioner and comply with requirements.
 2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
 - a. Monitor motor performance during procedures and do not operate motors in overload conditions.
 3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
 4. Report flow rates that are not within plus or minus 10 percent of design.
- B. Measure flow at all automatic flow control valves to verify that valves are functioning as designed.
- C. Measure flow at all pressure-independent characterized control valves, with valves in fully open position, to verify that valves are functioning as designed.
- D. Set calibrated balancing valves, if installed, at calculated pre-settings.
- E. Measure flow at all stations and adjust, where necessary, to obtain first balance.
 1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.
- F. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.
- G. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:
 1. Determine the balancing station with the highest percentage over indicated flow.
 2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
 3. Record settings and mark balancing devices.
- H. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.
- I. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.
- J. Check settings and operation of each safety valve. Record settings.

3.10 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating.
 5. Nameplate and measured voltage, each phase.



6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.11 PROCEDURES FOR BOILERS

A. Hydronic Boilers: Measure and record entering- and leaving-water temperatures and water flow rate for each boiler.

3.12 PROCEDURES FOR CABINET HEATER AND UNIT HEATER

A. Measure, adjust, and record the following data for each electric unit heater:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

3.13 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus 10 percent.

3.14 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.15 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.



2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.
 2. Fan curves.
 3. Manufacturers' test data.
 4. Field test reports prepared by system and equipment installers.
 5. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB subcontractor.
 3. Project name.
 4. Project location.
 5. Commissioner name and address.
 6. Contractor's name and address.
 7. Report date.
 8. Signature of TAB supervisor who certifies the report.
 9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 10. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 11. Nomenclature sheets for each item of equipment.
 12. Data for terminal units, including manufacturer's name, type, size, and fittings.
 13. Notes to explain why certain final data in the body of reports vary from indicated values.
 14. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Fan drive settings including settings and percentage of maximum pitch diameter.
 - e. VFD settings for variable-air-volume systems.
 - f. Settings for supply-air, static-pressure controller.
 - g. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.



3.16 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93



SECTION 23 07 00

HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulation Materials:
 - a. Cellular glass.
 - b. Flexible elastomeric.
 - c. Mineral fiber.
 - 2. Insulating cements.
 - 3. Adhesives.
 - 4. Mastics.
 - 5. Sealants.
 - 6. Factory-applied jackets.
 - 7. Field-applied fabric-reinforcing mesh.
 - 8. Field-applied jackets.
 - 9. Tapes.
 - 10. Securements.
 - 11. Corner angles.

1.3 RELATED SECTIONS:

- A. Division 23 Section 23 31 13 "Metal Ducts" for duct liners.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: For each type of product indicated.
- C. Submittal: For adhesives and sealants, including printed statement of VOC content.
- D. Shop Drawings:
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.



2. Detail insulation application at pipe expansion joints for each type of insulation.
3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
4. Detail removable insulation at piping specialties, equipment connections, and access panels.
5. Detail application of field-applied jackets.
6. Detail field application for each equipment type.

E. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Fire-Test-Response Characteristics: Insulation and related materials must have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to NY City Dept. of Buildings. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials must be applied.
- B. Products must not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel must have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel must be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials must not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cell-U-Foam Corporation; Ultra-CUF.
 - b. Pittsburgh Corning Corporation; Foamglas Super K.
 - c. Owens Corning



- d. Or Approved Equal
 2. Block Insulation: ASTM C 552, Type I.
 3. Special-Shaped Insulation: ASTM C 552, Type III.
 4. Board Insulation: ASTM C 552, Type IV.
 5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
 6. Preformed Pipe Insulation with Factory-Applied ASJ-SSL: Comply with ASTM C 552, Type II, Class 2.
 7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
 - d. Or Approved Equal
- H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I, II with factory-applied vinyl jacket and III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; SoftTouch Duct Wrap.
 - b. Johns Manville; Microlite XG
 - c. Knauf Insulation; Friendly Feel Duct Wrap.
 - d. Owens Corning; SOFTR Duct Wrap.
 - e. Or Approved Equal
- I. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ and with factory-applied FSK jacket. For equipment applications, provide insulation with factory-applied ASJ and with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide the following:
 - a. CertainTeed Corp.; CertaPro Commercial Board.
 - b. Johns Manville; 800 Series Spin-Glas.
 - c. Knauf Insulation; Insulation Board
 - d. Owens Corning; Fiberglas 700 Series.
 - e. Or Approved Equal
- J. Mineral-Fiber, Preformed Pipe Insulation:
1. Products: Subject to compliance with requirements, provide the following:
 - a. Johns Manville; Micro-Lok.
 - b. Knauf Insulation; 1000° Pipe Insulation.
 - c. Owens Corning; Fiberglas Pipe Insulation.
 - d. Or Approved Equal
 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.



3. Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Insulco, Division of MFS, Inc.; SmoothKote.
 - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
 - c. Rock Wool Manufacturing Company; Delta One Shot.
 - d. Or Approved Equal

2.3 ADHESIVES

- A. Materials must be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Cellular-Glass, Phenolic, Polyisocyanurate, Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-96.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
 - c. RBX Corporation; Rubatex Contact Adhesive.
 - d. Or Approved Equal
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Aeroflex USA Inc.; AeroSeal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
 - e. Or Approved Equal
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal
 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).



- E. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal
 - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- F. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, provide the following
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Speedline Vinyl Adhesive.
 - e. Or Approved Equal
 - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

- A. Materials must be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
 - 1. For indoor applications, use mastics that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 - g. Or Approved Equal
 - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 - 5. Color: White.

- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-10.



- b. Foster Products Corporation, H. B. Fuller Company; 35-00.
 - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
 - d. Marathon Industries, Inc.; 550.
 - e. Mon-Eco Industries, Inc.; 55-50.
 - f. Vimasco Corporation; WC-1/WC-5.
 - g. Or Approved Equal
2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 200 deg F.
 4. Solids Content: 63 percent by volume and 73 percent by weight.
 5. Color: White.

2.5 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
 - f. Vimasco Corporation; 750.
 - g. Or Approved Equal
2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-70.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Or Approved Equal.
3. Materials must be compatible with insulation materials, jackets, and substrates.
4. Permanently flexible, elastomeric sealant.
5. Service Temperature Range: Minus 100 to plus 300 deg F.
6. Color: White or gray.
7. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Or Approved Equal
2. Materials must be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.



5. Color: Aluminum.
 6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. ASJ Flashing Sealants, and PVC Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Vimasco Corporation; 750.
 - d. Or Approved Equal
 2. Materials must be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 5. Color: White.
 6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch, in a Leno weave, for duct, equipment, and pipe.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Foster Products Corporation, H. B. Fuller Company; Mast-A-Fab.
 - b. Vimasco Corporation; Elastafab 894.
 - c. P.I.C. Plastics, Inc.; FG Series.
 - d. Or Approved Equal

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets must comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.



- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 - e. Or Approved Equal
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
 5. Factory-fabricated tank heads and tank side panels.
- D. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
 - c. RPR Products, Inc.; Insul-Mate.
 - d. Or Approved Equal
 2. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
 3. Finish and thickness are indicated in field-applied jacket schedules.
 4. Moisture Barrier for Indoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper or 2.5-mil- thick Polysurlyn.
 5. Moisture Barrier for Outdoor Applications: 2.5-mil- thick Polysurlyn.
 6. Factory-Fabricated Fitting Covers:
 - a. Same material, finish, and thickness as jacket.
 - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - c. Tee covers.
 - d. Flange and union covers.
 - e. End caps.
 - f. Beveled collars.
 - g. Valve covers.
 - h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- E. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross-laminated polyethylene film covered with white aluminum-foil facing.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Polyguard; Alumaguard 60.
 - b. FlexClad
 - c. 3M VentureClad
 - d. Or Approved Equal



2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 - e. Or Approved Equal
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 - e. Or Approved Equal
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
 - e. Or Approved Equal
 2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.



2.10 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wing or closed seal.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
 - d. Or Approved Equal

- B. Insulation Pins and Hangers:
 - 1. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO; Nylon Hangers.
 - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
 - 3) RPR Products, Inc.; Bands.
 - 4) Or Approved Equal
 - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 - 2. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO.
 - 2) Midwest Fasteners, Inc.
 - 3) RPR Products, Inc.; Bands.
 - 4) Or Approved Equal

- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

- D. Wire: 0.080-inch nickel-copper alloy or 0.062-inch soft-annealed, stainless steel.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.
 - d. RPR Products, Inc.
 - e. Or Approved Equal



2.11 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that applies to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.



- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

- N. Finish installation with systems at operating conditions. Restore joint separations and cracking due to thermal movement.

- O. Restore damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.



3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.

- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.

- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
 - 1. Provide fire-stopping and fire-resistive joint sealers.

- F. Insulation Installation at Floor Penetrations:
 - 1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 - 2. Pipe: Install insulation continuously through floor penetrations.
 - 3. Seal penetrations through fire-rated assemblies. Provide fire-stopping and fire-resistive joint sealers.



3.5 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 MINERAL-FIBER INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
 - 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 - 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 - 3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
 - 4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 - 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- C. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.



- f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops must consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- D. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c.



Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

- a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops must consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

- A. Duct, Equipment, and Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 "Painting and Coating".
 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.



- C. Color: Final color as selected by Commissioner. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect ductwork, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection must be limited to two location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
 - 2. Inspect field-insulated equipment, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection must be limited to two location(s) for each type of equipment. For large equipment, remove only a portion adequate to determine compliance.
 - 3. Inspect pipe, fittings, strainers, and valves, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection must be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, three locations of threaded strainers, three locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, concealed return or exposed located in unconditioned space.
 - 3. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
- B. Items Not Insulated:
 - 1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 2. Factory-insulated flexible ducts.
 - 3. Factory-insulated plenums and casings.
 - 4. Flexible connectors.
 - 5. Vibration-control devices.
 - 6. Factory-insulated access panels and doors.



3.11 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, Supply-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.50-lb/cu. ft. nominal density.
- B. Concealed, Return-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.50-lb/cu. ft. nominal density.
- C. Concealed, Outdoor-Air Duct and Plenum Insulation: Mineral-fiber blanket 1-1/2 inches thick and 1.5-lb/cu. ft., nominal density.
- D. Concealed, Exhaust-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

3.12 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.13 INDOOR PIPING INSULATION SCHEDULE

- A. Refrigerant Piping:
 - 1. Cellular Glass: 1-inches thick
 - 2. Mineral-Fiber, Preformed Pipe, Type I: 1-inches thick.
 - 3. Flexible Elastomeric: 1 inch thick
- B. AC Condensate:
 - 1. Cellular Glass: 1-inches thick
 - 2. Mineral-Fiber, Preformed Pipe, Type I: 1-inches thick.
 - 3. Flexible Elastomeric: 1 inch thick

END OF SECTION 23 07 00

SECTION 23 08 00 COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This section includes commissioning process requirements for HVAC systems, assemblies, and equipment.
- B. Related Sections:
 - 1. DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for general commissioning process requirements.
 - 2. Division 23 Heating Ventilation & Air Conditioning

1.3 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the City of New York with an unbiased, objective view of the system’s installation, operation and performance. This process does not eliminate or reduce the responsibility of the Contractor to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the City of New York.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
 - 1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the Contractor.
 - 2. Verify and document proper performance of equipment and systems as per the written procedures.
 - 3. Verify that Operation & Maintenance documentation is complete and transferred to the City of New York.
 - 4. Verify that the City of New York’s maintenance personnel are adequately instructed.
- C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance

checkouts.

- D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx activities with the Commissioner and the Contractor.
- E. The Cx process shall not reduce the responsibility of the Contractor to comply with the Contract Documents.

1.4 DEFINITIONS

- A. Refer to the DDC General Conditions for definitions.

1.5 SUBMITTALS

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s role.
- B. Refer to the DDC General Conditions Section 01 33 00 “Submittal Procedures” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for specific requirements.
- C. In addition, provide the following:
 - 1. Certificates of readiness
 - 2. Certificates of completion of installation, pre-start, and startup activities.
 - 3. O&M manuals
 - 4. Test reports
- D. Control Drawings Submittal
 - 1. The control drawings shall have a key to all abbreviations.
 - 2. The control drawings shall contain graphic schematic depictions of the systems and each component.
 - 3. The schematics will include the system and component layout of any equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
 - 4. Provide a full points list with at least the following included for each point:
 - a. Controlled system
 - b. Point abbreviation
 - c. Point description
 - d. Display unit
 - e. Control point or set point (Yes / No)
 - f. Monitoring point (Yes / No)
 - g. Intermediate point (Yes / No)
 - h. Calculated point (Yes / No)

1.6 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: The Contractor will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

- A. Refer to the DDC General Conditions Section 01 91 13 "General Commissioning Requirements for MEP Systems" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. The Contractor shall ultimately be responsible for all standard testing equipment for the HVAC&R system and controls system in Division 23. A sufficient quantity of two-way radios shall be provided by the Contractor.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.
- C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the CxA but shall not become the property of the City of New York.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems.
- B. Red-lined Drawings:
 - 1. The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
 - 2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 - 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 - 4. The Contractor will create the as-built drawings.
- C. Operation and Maintenance Data:
 - 1. The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
 - 2. The CxA will review the O&M literature once for conformance to project requirements.
 - 3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Instruction:
 - 1. The Contractor will provide demonstration and instruction as required by the Contract Documents.
 - 2. A complete instruction plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any instruction.
 - 3. An instruction agenda for each instruction session shall be submitted to the CxA at least one (1) week prior the instruction session.
 - 4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and the Commissioner. A copy of the test record shall be provided to the CxA and the Commissioner.
 - 5. Engage a Factory-authorized service representative to instruct the City of New York's maintenance personnel to adjust, operate, and maintain specific equipment.
 - 6. Instruct the City of New York's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
 - 7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. The commissioning responsibilities applicable to the Division 23 trade are as follows (all



references apply to commissioned equipment only):

1. Perform commissioning tests at the direction of the CxA.
2. Attend construction phase controls coordination meetings.
3. Attend testing, adjusting, and balancing review and coordination meetings.
4. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
5. Provide information requested by the CxA for final commissioning documentation.
6. Include requirements for submittal data, operation and maintenance data, and instruction in each purchase order.
7. Prepare preliminary schedule for Mechanical system orientations and inspections, operation and maintenance manual submissions, instruction sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for the City of New York. Distribute preliminary schedule to commissioning team members.
8. Update schedule as required throughout the construction period.
9. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for all commissioned equipment.
10. Assist the CxA in all verification and functional performance tests.
11. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
12. Gather operation and maintenance literature on all equipment and assemble in binders as required by the Contract Documents. Submit to CxA (45) days after submittal acceptance.
13. Coordinate with the CxA to provide (72) hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
14. Notify the CxA a minimum of (2) weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.
15. Participate in, and schedule vendors and subcontractors to participate in the instruction sessions.
16. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
 - a. HVAC&R equipment including all fans, air handling units, piping, ductwork, dampers, terminals, and all other equipment furnished under this Division.
 - b. Controls system used for equipment monitoring and manipulation
 - c. Fire stopping in the fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of smoke barriers.
 - d. Fire detection and smoke detection devices furnished under other divisions of the specification.
17. The Contractor shall ensure the equipment suppliers shall document the performance of their equipment.
18. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.
19. The Contractor shall direct the TAB subcontractor to:

- a. Attend initial commissioning coordination meeting scheduled by the CxA.
 - b. Submit the site specific testing and balancing plan to the CxA and Commissioner for review and acceptance.
 - c. Attend the testing and balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in testing, adjusting, and balancing the HVAC&R system.
 - d. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.
20. Provide instruction to the City of New York’s maintenance personnel using expert qualified personnel, as specified.
21. Contractor shall direct equipment suppliers to:
- a. Provide all requested submittal data, including detailed start-up procedures and specific requirements needed to keep warranties in force.
 - b. Assist in equipment testing.
 - c. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- B. Refer to the DDC General Conditions for additional Contractor responsibilities.

3.3 CxA RESPONSIBILITIES

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the CxA that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the CxA that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as

directed by the CxA.

3.5 TESTING, ADJUSTING AND BALANCING VERIFICATION

- A. Air and water testing, balancing and equipment performance verification shall be accomplished by an independent test and balance firm under direction of the Contractor. The CxA shall spot check this work to verify accuracy of results
- B. Prior to performance of Testing, Adjusting and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- C. Notify the CxA at least ten (10) days in advance of testing and balancing work and provide access for the CxA to witness testing and balancing work.
- D. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
 - 1. The CxA will notify the Contractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. Use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.6 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The CxA along with the Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible, as determined by the Commissioner.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct to alter set points when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system,

document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 23 sections. Provide submittals, test data, inspector record, and certifications to the CxA.
- B. **HVAC&R Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 23 Sections. Assist the CxA with preparation of testing plans.
- C. **Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment:** Test requirements are specified in Division 23 piping Sections. Prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include but not limited to the following:
 - 1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
 - 2. Description of equipment for flushing operations.
 - 3. Minimum flushing water velocity.
 - 4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.
- D. **Refrigeration System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- E. **HVAC&R Distribution System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.
- F. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.
- G. **The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:**
 - 1. BMS Sensors, Controls and Operating Sequences
 - 2. Seven (7) Heat Pumps

3. Three (3) Variable Refrigerant Flow Air Cooled Condensing Units
4. One (1) Branch Selector Box
5. One (1) Energy Recovery Ventilator
6. Eight (8) Electric Unit Heaters
7. Five (5) Exhaust Fans
8. Associated Piping, Ductwork and Specialties

3.8 OPERATION AND MAINTENANCE MANUALS

- A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems.”
- B. Refer to the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for the CxA roles in the Operation and Maintenance Manual contribution, review and approval process.
- C. An updated as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal.

3.9 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

- A. Refer to the DDC General Conditions Section 01 79 00 “Demonstration and Owner’s Pre-Acceptance Orientation” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to instruction.
- B. Contractor’s instruction responsibilities pertaining to mechanical work:
 1. Provide the CxA with an instruction plan two weeks before the planned Instruction.
 2. Provide comprehensive orientation and instruction in the understanding of the systems and the operation and maintenance of each piece of HVAC equipment including, but not limited to, all HVAC equipment (ex. pumps, heat exchangers, chillers, heat rejection equipment, air conditioning units, air handling units, fans, terminal units, controls and water treatment systems, etc.) to the City of New York’s maintenance personnel.
 3. Instruction shall normally start with classroom sessions followed by hands-on instruction on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 5. The appropriate trade or manufacturer’s representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing subcontractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment is required. More than one party may be required to execute the instruction.



6. The Contractor shall direct the controls subcontractor to attend sessions other than the controls instruction, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.
 7. The instruction sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
 8. Hands-on instruction shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.
 9. Fully explain and demonstrate the operation, function and overrides of any local packaged controls not controlled by the central control system.
 10. Instruction shall occur after functional testing is complete, unless approved otherwise by the Commissioner.
- C. Contractor's instruction responsibilities pertaining to controls:
1. Provide the CxA and Commissioner with an instruction plan four weeks before the planned instruction.
 2. Provide the designated City of New York's maintenance personnel instruction on the control system in this facility. The intent is to clearly and completely instruct the City of New York's maintenance personnel on all the capabilities of the control system.
 3. Instruction manuals. The standard operating manual for the system and any special instruction manuals will be provided for each instructee, with three extra copies left for the O&M manuals. In addition, copies of the system technical manual will be demonstrated during instruction and three copies submitted with the O&M manuals. Manuals shall include detailed description of the subject matter for each session. The manuals will cover all control sequences and have a definitions section that fully describes all relevant words used in the manuals and in all software displays. Manuals will be approved by the CxA and Commissioner. Copies of audiovisuals shall be delivered to the Commissioner.
 4. The instructions will be tailored to the needs and skill-level of the instructee.
 5. The instructors will be knowledgeable on the system and its use in buildings. For the on-site sessions, the most qualified instructor(s) will be used. The Commissioner shall approve the instructor prior to scheduling the instruction
 6. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 7. Three (3) instruction sessions are required:
 - a. Instruction I. Control System. The first instruction shall consist of 8 hours of actual instruction. This instruction may be held on-site or in the supplier's facility. If held off-site, the instruction may occur prior to final completion of the system installation. Upon completion, each student, using appropriate documentation,

should be able to perform elementary operations and describe general hardware architecture and functionality of the system.

b. Instruction II. Building Systems. The second session shall be held on-site for a period of 8 hours of actual hands-on instruction after the completion of system commissioning. The session shall include instruction on:

- 1) Specific hardware configuration of installed systems in this building and specific instruction for operating the installed system, including HVAC systems, lighting controls and any interface with security and communication systems.
- 2) Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing set points and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
- 3) All trending and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends. Instructee will actually set-up trends in the presence of the instructor.
- 4) Every screen shall be completely discussed, allowing time for questions.
- 5) Use of keypad or plug-in laptop computer at the zone level.
- 6) Use of remote access to the system via phone lines or networks.
- 7) Setting up and changing an air terminal unit controller.
- 8) Graphics generation
- 9) Point database entry and modifications
- 10) Understanding Direct Digital Controls field panel operating programming (when applicable)

D. Contractor's responsibilities pertaining to Testing, Adjusting and Balancing:

1. Meet with maintenance personnel after completion of TAB and instruct them on the following:
 - a. Go over the final TAB report, explaining the layout and meanings of each data type.
 - b. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
 - c. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
 - d. Discuss any temporary settings and steps to finalize them for any areas that are not finished.

- e. Other salient information that may be useful for facility operations, relative to TAB.

END OF SECTION 23 08 00



SECTION 23 09 00

INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL REQUIREMENTS

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Instrumentation for controls
 - 2. Field Devices
 - 3. Building Automatic System
 - 4. Control Sequence

1.3 GENERAL

- A. Description of Work: Provide all labor, materials, equipment and services required to furnish an automatic temperature control system that conforms to the plans and specifications and meets the requirements of the heating, ventilating and air-conditioning systems serving the building.
- B. Obtain services of an experienced subcontractor that is regularly engaged in the installation and maintenance of BMS systems. Provide all necessary information and required field supervision for a complete and operable automatic temperature control system.
- C. Provide a complete system of electronic automatic temperature controls. Provide all material, components, devices, thermostats, safety devices, control panels, control dampers, controllers, transformers, actuators, sensing devices, time clocks, relays, control wiring diagrams (line and low voltage), interlocking wiring, smoke detectors, labor, etc. indicated, required or specified.
- D. The temperature control system must be electronic and include electronic sensors and electric actuators unless noted otherwise. Include all work required for a complete operational system as defined in the entire set of drawings and specifications, including but not limited to associated specifications for mechanical and electrical work, and all contract drawings.
- E. Provide all line voltage and low voltage wiring, conduit, panels, and accessories for a complete operational control system. The contractor is responsible for all electrical work associated with the automatic temperature control system, any interface to any other systems including but not limited to HVAC and plumbing systems, and as shown in the contract documents. All line and low voltage must be in accordance with Division 26 requirements. All final electrical connections to each stand-alone controller is the responsibility of contractor.



F. Furnish all wells for water monitoring devices, flow switches, and alarms to be installed.

1.4 WORK INCLUDED

A. The scope encompasses the following systems:

1. Variable Refrigerant Volume System with manufacture furnished controls into the BMS system for monitoring and control via BACnet gateway
2. Energy Recovery Unit with manufacturer furnished with BACnet controller
3. Garage Heating
4. Garage Summer Ventilation System
5. Vehicle Exhaust Capture System
6. IT Closet
7. Elevator Machine Room
8. Outdoor Air Airflow Monitoring

B. Furnish a totally native BACnet-based system, including a browser-based operator interface that can be accessed using standard web browsers. The operator interface, all building controllers, application controllers, and all input/output devices must communicate using the protocols and network standards as defined by ANSI/ASHRAE Standard 135–2001, BACnet. In other words, all controllers, including unitary controllers, must be native BACnet devices. No gateways must be used for communication to controllers installed under this section. Gateways may be used for communication to systems installed under other sections.

C. Provide all necessary BACnet-compliant hardware and software to meet the system’s functional specifications. Provide Protocol Implementation Conformance Statement (PICS) for Windows-based control software and every controller in system, including unitary controllers.

D. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.

E. Implement the detailed design for all analog and binary objects, system databases, graphic displays, logs, and management reports based on control descriptions, logic drawings, configuration data, and bid documents.

F. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

G. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

H. Provide and install all interconnecting cables between all operator’s terminals and peripheral devices (such as printers, etc.) supplied under this section.

I. Provide all power wiring to all control panels and control devices requiring power.

J. Provide complete manufacturer’s specifications for all items that are supplied. Include vendor name of every item supplied.



- K. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.
- L. Provide a comprehensive operator and technician instructions as described herein.
- M. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.
- N. Provide new sensors, dampers, valves, and install only new electronic actuators. No used components must be used as any part or piece of installed system.

1.5 SYSTEM DESCRIPTION

- A. A distributed logic control system complete with all software and hardware functions must be provided and installed. System must be completely based on ANSI/ASHRAE Standard 135-2001, BACnet. This system is to control all mechanical equipment, including all unitary equipment and all air handlers, boilers, chillers, and any other listed equipment using native BACnet-compliant components. Non-BACnet-compliant or proprietary equipment or systems (including gateways) must not be acceptable and are specifically prohibited.
- B. The Building Management System (BMS) application program must be written to communicate specifically utilizing BACnet protocols. Software functions delivered on this project must include password protection, scheduling (including optimum start), alarming, logging of historical data, full graphics including animation, full suite of field engineering tools including graphical programming and applications. Systems using operating systems other than that described above are strictly prohibited. All software required to program application specific controllers and all field level devices and controllers will be left with the City of New York.
- C. Building controllers must include complete energy management software, including scheduling building control strategies with optimum start and logging routines. All energy management software and firmware must be resident in field hardware and must not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions only. Provide zone-by-zone direct digital logic control of space temperature, scheduling, runtime accumulation, equipment alarm reporting, and override timers for after-hours usage.
- D. All application controllers for every terminal unit, air handler, all central plant equipment, and any other piece of controlled equipment must be fully programmable. Application controllers must be mounted next to controlled equipment and communicate with building controller via BACnet LAN.
- E. Room sensors must be provided with digital readout that allows the user to view room temperature, adjust the room setpoint within preset limits and index override period. Include all necessary wiring and firmware such that room sensor includes field service mode. Field service mode must allow technician to balance VAV zones and access any parameter in zone controller.
- F. All control equipment used to perform any or all of the specified smoke control sequences must be UL-864 UUKL listed. This includes all field controllers and global control devices. Non UUKL



rated equipment must not be networked to any devices on the network performing smoke control sequences unless isolated by a UUKL rated device. See drawings for actual sequence of operations.

1.6 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each control device indicated.
 - 1. Drawings
 - a. The system supplier must submit engineered drawings, control sequence, and bill of materials for approval.
 - b. Drawings must be submitted in the following standard sizes: 11” x 17” (ANSI B).
 - c. Drawings must be in PDF format.
 - 2. System Documentation
 - a. Include the following in submittal package:
 - b. System configuration diagrams in simplified block format.
 - c. All input/output object listings and an alarm point summary listing.
 - d. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
 - e. Complete bill of materials, valve schedule and damper schedule.
 - f. Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
 - g. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.
 - h. For all system elements—operator’s workstation(s), building controller(s), application controllers, routers, and repeaters,—provide BACnet Protocol Implementation Conformance Statements (PICS) as per ANSI/ASHRAE Standard 135-2001.
 - i. Provide complete description and documentation of any proprietary (non-BACnet) services and/or objects used in the system.
 - j. A list of all functions available and a sample of function block programming that must be part of delivered system.
 - 3. Project Management
 - a. Provide a detailed system design and installation schedule with time markings and details for hardware items and software development phases. Schedule must show all the target dates for transmission of project information and documents and must indicate timing and dates for system installation, debugging, and commissioning.
 - 4. BACnet Device Object Naming Conventions
 - a. The manufacturer’s representative must submit a BACnet Device Object Naming Convention Plan (DONCP) to the Commissioner during the submittal process. The plan must be approved by the Commissioner. It is the responsibility of the contractor to coordinate the DONCP with the Commissioner.



- b. The DONCP must be designed to eliminate any confusion between individual points in a facility/campus wide BMS system. It will also be designed to allow for future expansion and consistency. Each device on a BACnet internetwork (including other manufacturer's devices) must have a unique device instance. This is a major consideration when adding to an existing system or interconnecting networks. Thorough and accessible site documentation is critical.
 - c. A consistent object (point) naming convention must be used to facilitate familiarity and operational ease across an eventual large campus or inventory of facilities. The following section is designed as recommendations only. It is the responsibility of the contractor to coordinate the DONCP with the Commissioner
 - d. BACnet requires that all devices have a Device object name that is unique throughout the entire work. To comply with this requirement all BACnet devices should be configured with a Device Object Name that is based on the naming conventions described in this section. This includes all physical devices as well as any logical BACnet devices that are represented by gateways. The vendor must coordinate with the City of New York's staff to ensure that the correct names are used. Device Object Name properties must support strings of at least 50 characters in length.
 - e. Every system device has addresses by which any other BACnet device can identify it and route information to and from it. Although there are a number of addresses to consider, the scheme is fairly straightforward. It can become complicated, however, if addresses have not been documented adequately or there is no logical addressing scheme.
 - f. Addressing scheme is of the utmost importance. Adopt a hierarchical and uniform addressing scheme for device instances to help quickly identify the function and location of different devices when troubleshooting. Additionally, it's very important to document every element of addressing scheme and update the site documentation with any changes.
5. This section first covers the important addressing issues with respect to BACnet LANs and it gives a practical application you can use to check your understanding. BACnet addressing - Three types of addresses are important in any BACnet system: network numbers, media access control (MAC) addresses, and device instances. Each BACnet device has these addresses associated with it. Though all three can be thought of as addresses, they are all very different both in how they function and how they are assigned.
- a. Network numbers - Identifies the network to which a BACnet device belongs. Every network on a BACnet LAN has a unique numerical identifier—a network number. This network number is used by BACnet devices only; it does not rely on nor does it affect any other network protocols. LANs connected by a router must have different network numbers. No interconnected BACnet networks can have the same network number. Network number range is 1–65534, for a maximum of 65534 interconnected BACnet networks.
 - b. MAC addresses - Hardware-oriented. The MAC address uniquely identifies a device on its particular network. Each network type—Ethernet and MS/TP—has its own MAC addressing scheme. A device that exists on two or more networks will have a



MAC address for each one. Devices can have the same MAC addresses as long as they are on networks with different network numbers.

- c. Ethernet devices - For Ethernet LANs, the IEEE assigns a certain range of MAC addresses to manufacturers of Ethernet products. Manufacturer then assigns a unique MAC address to each of its Ethernet devices.
- d. MS/TP devices - For devices on an MS/TP LAN, you assign the MAC address for each controller. For BACtalk VLCs, these are assigned with DIP switches. Devices on an MS/TP LAN are designated as either masters or slaves, which affects how they can be addressed. This is a requirement of the BACnet specification. All BACtalk MS/TP devices are masters.
- e. Device instances - Software-oriented. The device instance identifies the device to the BACnet software and is the address most often encountered. The device instance is a shortcut to having to specify a MAC address and network number each time an operation is performed. Device instances range from 0–4194302.

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Materials and equipment must be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and must be manufacturer's latest standard design that complies with the specification requirements.
- C. Subcontractor must have single source responsibility for the complete installation and documented verification for proper operation of the control system that must include as a minimum, point to point checkout, sensor calibration, verification of programmed sequences. Supplier must have an in-place support facility within proximity of the site with technical staff, spare parts inventory, all necessary test and diagnostic equipment and a maintained service organization consisting of competent servicemen, for a period of not less than three years.

1.8 USER MANUALS

- A. Submit two (2) draft copies of User Manual for review. After review by Commissioner, incorporate review comments and submit four (4) interim final copies. Upon completion of project, acceptance of project by the Commissioner, submit in digital format "as built" manual. The User Manual must include the same information that was furnished with the manuals turned over for the base building.

1.9 WORK PERFORMANCE SCHEDULE

- A. A time-phased schedule for delivery, installation, and acceptance of components for the complete system must be prepared. Submit updates and changes to this schedule promptly to the Commissioner.

1.10 GUARANTEE

- A. The Contractor must guarantee the BMS system to be free from defects in workmanship and material for a period of one (1) year from the date of acceptance by the Commissioner. During the guarantee



period, the Contractor must furnish all labor to repair or replace all items or components that fail due to defects in workmanship or material.

1.11 INSTRUCTION

- A. The Contractor must provide competent instructors to give full instruction to designated personnel in the adjustment, operation and maintenance of the system installed rather than a general instruction course. Instructors must be thoroughly familiar with all aspects of the subject matter they are to teach. All instruction sessions must be held during normal work hours of 8:00 a.m. to 4:30 p.m. weekdays. Provide at least 4-hour session.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/INSTALLERS

- A. The building management system and all components must be Honeywell , Siemens, Johnson, Allerton, or approved equal.

2.2 NETWORK ARCHITECTURE

A. Building's Intra Network

- 1. Install primary and secondary LAN's required to support the complete BMS system. The Operator Workstation for the building must be located in Mechanical Room 235 or as advised by the Commissioner.

B. BACnet Primary LAN

- 1. Primary LAN for the building automation system must consist of a high speed network utilizing BACnet over Ethernet or BACnet/IP. The Primary LAN must be used for communications between BACnet B-BC devices, B-AAC devices, B-ASC devices, and the Operator Workstation.

C. BACnet Secondary LAN

- 1. A secondary LAN, separate from the Primary LAN must be used for communications between B-ASC devices and the B-BC or B-AAC that provides BACnet router services for the device. The Secondary LAN must utilize BACnet MS/TP for communications. The intent of the separate Primary LAN and Secondary LAN is to isolate traffic between B-BC's or B-AAC's and their associated B-ASC devices from the primary LAN.

2.3 OPERATOR INTERFACE

A. Browser Based BMS Operator Interface

- 1. The system must be capable of supporting an unlimited number of clients using standard Web browser. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers must not be acceptable.



2. The Web browser software must run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the Building Automation System (BMS), must not be acceptable.
3. The Web browser client must support at a minimum, the following functions:
 - a. User log-on identification and password must be required. If an unauthorized user attempts access, notice of access failure must be displayed. Security using authentication and encryption techniques to prevent unauthorized access must be implemented.
 - b. HTML programming must not be required to display system graphics or data on a Web page. HTML editing of the Web page must be allowed if the user desires a specific look or format.
 - c. Storage of the graphical screens must be in the Network Area Controller (NAC), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
 - d. Real-time values displayed on a Web page must update automatically without requiring a manual “refresh” of the Web page.
 - e. Users must have administrator-defined access privileges. Depending on the access privileges assigned, the user must be able to perform the following:
 - 1) Modify common application objects, such as schedules and setpoints in a graphical manner.
 - 2) Commands binary objects to start and stop.
 - 3) View logs and charts.
 - 4) View alarms.
 - f. Graphic screens on the Web Browser client must support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.
4. Alarms
 - a. Alarm feature must allow user configuration of criteria to create, route, and manage alarms and events. It must be possible for specific alarms from specific points to be routed to specific alarm recipients. The alarm management portion of the user interface must, at the minimum, provide the following functions:
 - 1) Allow configuration to generate alarms on any numeric, binary, or data point in the system.
 - 2) Generate alarm records that contain a minimum of a timestamp, original state, acknowledged state, alarm class and priority.
 - 3) Allow the establishment of alarm classes that provide the routing of alarms with similar characteristics to common recipients.
 - 4) Allow a user, with the appropriate security level, to manage alarms - including sorting, acknowledging, and tagging alarms.
5. Reports and Summaries
 - a. Reports and Summaries must be generated and directed to the user interface displays, with subsequent assignment to printers, or disk. As a minimum, the system must provide the following reports:



- 1) All points in the BMS
 - 2) All points in each BMS application
 - 3) All points in a specific controller
 - 4) All points in a user-defined group of points
 - 5) All points currently in alarm
 - 6) All BMS schedules
 - 7) All user defined and adjustable variables, schedules, interlocks and the like.
- b. Reports must be exportable to .pdf, .txt, or .csv formats.
 - c. The system must allow for the creation of custom reports and queries.
6. Schedules
- a. A graphical display for time-of-day scheduling and override scheduling of building operations must be provided. At a minimum, the following functions must be provided:
 - 1) Regular schedules
 - 2) Repeating schedules
 - 3) Exception Schedules
 - b. Weekly schedules must be provided for each group of equipment with a specific time use schedule.
 - c. It must be possible to define one or more exception schedules for each schedule including references to calendars
 - d. Monthly calendars must be provided that allow for simplified scheduling of holidays and special days. Holidays and special days must be user-selected with the pointing device or keyboard.
7. Password
- a. Multiple-level password access protection must be provided to allow the user/manager to user interface control, display, and database manipulation capabilities deemed appropriate for each user, based on an assigned password.
 - b. Each user must have the following: a user name, a password, and access levels.
 - c. The system must provide the capability to require a password of minimum length and require a combination of characters and numerical or special characters.
 - d. When entering or editing passwords, the system must not echo the actual characters for display on the monitor.
 - e. The system must provide unlimited flexibility with access rights. A minimum of four levels of access must be provided along with the ability to customize the system to provide additional levels.
 - f. A minimum of 100 unique passwords must be supported.
 - g. Operators must be able to perform only those commands available for their respective passwords. Display of menu selections must be limited to only those items defined for the access level of the password used to log-on.
 - h. The system must automatically generate a report of log-on/log-off and system activity for each user.
 - i. All log data must be available in .pdf, .txt, and .csv formats.



8. Dynamic Color Graphics
 - a. The graphics application program must be supplied as an integral part of the User Interface.
 - b. The graphics applications must include a create/edit function and a runtime function. The system architecture must support an unlimited number of graphics documents (graphic definition files) to be generated and executed.
 - c. The graphics must be able to display real-time data that is acquired, derived, or entered.
 - d. Graphics runtime functions –Each graphic application must be capable of the following functions:
 - 1) All graphics must be fully scalable
 - 2) The graphics must support a maintained aspect ratio.
 - 3) Multiple fonts must be supported.
 - 4) Unique background must be assignable on a per graphic basis.
 - e. Operation from graphics – It must be possible to change values (setpoints) and states in systems controlled equipment within the Web browser interface.
 - f. Graphic editing tool – A graphic editing tool must be provided that allows for the creation and editing of graphic files. The graphic editor must be capable of performing/defining all runtime binding.
9. Historical Data Collection
 - a. All numeric, binary or data points in the system database must allow their values to be logged over time (trend log). Each historical record must include the point's name, a time stamp including time zone, and the point's value.
 - b. The configuration of the historical data collection must allow for recording data BMSed on change of value or on a user-defined time interval.
 - c. The configuration of the historical data collection must allow for the collection process to stop or rollover when capacity has been reached.
 - d. A historical data viewing utility must be provided with access to all history records. This utility must allow historical data to be viewed in a table or chart format.
 - e. The history data table view must allow the user to hide/show columns and to filter data BMSed on time and date. The history data table must allow exporting to .txt, .csv, or .pdf file formats.
 - f. The historical data chart view must allow different point histories to be displayed simultaneously, and also provide panning and zooming capabilities.
10. Audit Log
 - a. For each log entry, provide the following data;
 - b. Time and date
 - c. User ID
 - d. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.
 - e. Database Backup and Storage
 - f. The user must have the ability to backup the System Controller databases.



11. Touch Screen Operators Workstation
 - a. Provide one panel mounted touch screen operators workstation to be installed on the face of the Network Area Control Panel.
 - b. Touch screen operator's workstation must be provided for command entry, information management, network alarm annunciation/management and database management functions. All real-time control functions must be resident in the DDC controllers to facilitate greater fault tolerance and reliability.
 - c. The touch screen operator's workstation must consist of the following as a minimum.
 - 1) Touch panel computer with minimum processor of 1.6 GHz 1 MB cache, 17" SXGA TFT color LCD screen, I/O ports - (4) serial, (1) parallel, (1) VGA, (2) USB, (3) audio, (1) PS-2, Type II PCMIA, Type II Compact flash slot, PC/104 Plus X 1 expansion slot.
12. Touch Screen Operators Workstation Software
 - a. A 32-bit, multi-tasking Microsoft windows NT or windows 2000 environment that allows the user to run several applications simultaneously. Other windows applications must run simultaneously with the building management system software including but not limited to word, excel, access, etc.
 - b. Provide a user interface that must minimize the use of a typewriter style keyboard through the use of a mouse or similar pointing device and "point and click" approach to menu selection.
 - c. Operator specific password access protection must allow the user to limit workstation control, display and data base manipulation capabilities for each object in the system. An object must be defined as any input or output point, set point, system program, etc.
 - d. Provide a graphical spreadsheet-type format for simplification of time-of-day scheduling and overrides of building operations. Provide schedules for 365 days in advance.
 - e. The display panel must be provided with color graphics. All workstation(s) software must include a graphical viewing and control environment and definition and construction of dynamic color graphic displays.
 - f. Provide system color graphics for each HVAC system and for each electrical, plumbing and/or piping system that is monitored and/or controlled by the BMS. Provide scaled floor plans indicating equipment location, service, and system data as required.

2.4 BUILDING CONTROLLER

A. General

1. All controllers furnished for this project must be powered from an emergency power source and must have a standalone UPS. The UPS must include external batteries, line conditioner, and all other accessories for a complete system. The UPS must be sized to provide the BMS equipment with un-interrupted power for a minimum of 15 minutes. UPS's must be as manufactured by Liebert, Exide, APC USA or approved equal.

B. Network Area Controller (NAC)



1. The NAC must provide the following hardware features as a minimum:
 - a. Communications
 - 1) One 10/100 Mb Ethernet Port – RJ-45 connection
 - 2) One RS-232 port
 - 3) One RS-485 port (up to 57,600 baud)
 - 4) Optional internal auto-dial/auto-answer 56K modem.
 - 5) All required protocol drivers are included.
 - b. Inputs/Outputs
 - 1) Modular expansion modules for adding hardwired analog and digital inputs and outputs directly to the NAC panel.
 - c. Battery Backup
 - 1) Battery backup provided for all on board functions including I/O
 - 2) Battery is monitored and trickle charged
 - 3) Battery maintains processor operation through power failures for a pre-determined interval, and then writes all data to flash memory, shuts the processor down, and maintains the clock for five years.
 - d. Environment
 - 1) Must be capable of operation over a temperature range of 0°C to 55°C.
 - 2) Must be capable of withstanding storage temperatures of between 0°C and 70°C.
 - 3) Must be capable of operation over a humidity range of 5% to 95% RH, non-condensing
 - e. Performance
 - 1) Supports up to 100 devices.
 2. Automation network – The Network Area Controller (NAC) must reside on the automation network. Each NAC must support one or more sub-networks of controllers.
 3. User Interface – Each Network Area Controller (NAC) must have the ability to deliver a web based user interface as previously described. All computers connected physically or virtually to the automation network must have access to the web based UI.
 4. Power Failure – In the event of the loss of normal power, The Network Area Controller (NAC) must continue to operate for a define period after which there must be an orderly shutdown of all programs to prevent the loss of database or operating system software. Flash memory must be incorporated for all critical controller configuration data.
 - a. During a loss of normal power, the control sequences must go to the normal system shutdown conditions.
 - b. Upon restoration of normal power and after a minimum off-time delay, the controller must automatically resume full operation without manual intervention through a normal soft-start sequence.
 - c. Certification – All controllers must be listed by Underwriters Laboratories (UL).
- C. Advanced Application Controller
1. Control of AO's and BO's and monitoring of AI's and BI's are permitted on devices that conform to the requirements for the BACnet Advanced Application Controller (B-AAC) as



identified in ASHRAE Standard 135. B-ASC's must be provided with all supporting BACnet services as a local function. The device must not depend upon any other devices for the functionality of schedule or alarm activities. Alternatively, the B-ASC's or B-BC's that the device is dependent upon must utilize an Uninterruptible Power Supply (UPS). A single piece of equipment must utilize a single controller. Control functions for a single piece of equipment may not be divided among controllers.

D. Application Specific Controllers

1. Control of AO's and BO's and monitoring of AI's and BI's are permitted on devices that conform to the requirements for the BACnet Application Specific Controller (B-ASC) as identified in ASHRAE Standard 135. Where B-ASC's are utilized, any supporting B-BC or B-ASC must be provided with an Uninterruptible Power Supply (UPS) to avoid any unintentional loss in the support of BACnet services due to a power outage for the B-BC while the B-ASC is functional.

E. Gateways

1. Gateways between BACnet and any other protocols must not be allowed for this project.

F. Smart Sensor/Actuator

1. BACnet Smart sensors (B-SS) and actuators (B-SA) must not be permitted for use on this project. All system I/O must be connected directly to a B-AAC or B-ASC device.

2.5 AUTOMATIC CONTROLS

- A. Furnish and install as herein specified a complete automatic temperature control system of the direct digital control electronic type. All temperature control under this contract is to be fully modulating type, except where noted otherwise. The system must be complete in all respects including sensors, valves, dampers, relays, etc. to provide the functions as hereinafter described, regardless of whether or not said sensors, relay etc., are specifically mentioned hereinafter. The system must be installed complete in all respects by competent mechanics, properly trained by the manufacturer.

2.6 FIELD DEVICES

A. General

1. Provide field devices for input and output of digital (binary), and analog, signals into BACnet devices. Provide signal conditioning and/or filtering for all field devices as recommended by field device manufacturers, and as required for proper operation of the system.
2. It the responsibility of the contractor to provide equipment as identified in this specification section and ensure that all field devices are compatible with the controllers to be used on the project.
3. Transmitters specified herein are generally 4-20 mA "two-wired" type transmitters, with power for the device expected to be supplied from the transformer powering the controller.



4. For field devices specified hereinafter that require signal conditioners, signal boosters, signal repeaters, or other devices for proper interface to controllers, the contractor must furnish and install proper device. Such devices must have accuracy equal to, or better than, the accuracy listed for respective field devices.
5. Accuracy, as stated in this section, must include combined effects of non-linearity, non-repeatability and hysteresis.

B. Temperature Sensors

1. All temperature sensors must use RTD with sensor accuracy of +/- .5 deg F. Provide Minco, Vaisala, Mamac or Approved Equal.
2. Single Point Duct Temperature Sensor
 - a. These must consist of a sensing element, junction box for wiring connections, and a gasket to prevent air leakage or vibration noise. The temperature range as required for resolution is indicated above. The sensor probe must be stainless steel.
 - b. Sensing element - RTD or thermistor +/- 0.5 deg F accuracy at calibration point.
3. Averaging Duct Temperature Sensor
 - a. These must consist of an averaging element, junction box for wiring connections and gasket to prevent air leakage. Provide sensor lengths and quantities to result in one foot of sensing element for each, two square feet of coil/duct face area. Temperature range must be as required for resolution as indicated above.
 - b. Sensing element - RTD or thermistor +/- 0.5 deg F accuracy at calibration point.
4. OA Sensors
 - a. These must consist of a sensor, sun shield, utility box, and watertight gasket to prevent water seepage. The temperature range must be as required for the resolution indicated above;
 - b. Sensing element - RTD, thermistor, or integrated circuit, +/- 0.4 deg F accuracy at calibration point;
 - c. On major/critical systems, one must be provided for each;
 - d. Sensors must be located on a north wall of the building and installed with stand-offs. On 100% OA systems and lab buildings, locate sensor in outside air plenum.
 - e. Provide one sensor per mechanical room or building-level controller.

C. Pressure Sensors

1. Air Differential Pressure Transmitters:
 - a. Applications: Duct static pressure, air flow VP, filter DP, Fan DP, etc.;
 - b. Provide the smallest range feasible for the application. Provide zero and span adjustments;



- c. Accuracy: Plus or minus 1% of full scale for static and 0.25% for air velocity.
- d. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Vaisala
 - 2) Mamac,
 - 3) Setra
 - 4) Or Approved Equal

D. Air Flow Station

- 1. Provide for the indicated HVAC systems, solid state electronic airflow processing centers capable of performing the dedicated airflow control functions as outlined in the "Sequence of Operations" in Part 4 and indicated on the control schematics.
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Paragon Controls Inc.; Airflow Processing Centers
 - b. Air Monitor
 - c. Sensacon
 - d. Or Approved Equal
- 3. Each airflow processing center must be capable of operating on 24VAC power.
- 4. The airflow processing centers must be complete with three mode (P-I-1/D) analog controllers as required; all mounted within the processing center. Each functional center will contain the necessary manual span, zero and setpoint adjustments conveniently located inside the center.
- 5. Each controller must be provided with test terminals to permit the temporary installation of electronic meters to facilitate signal readouts during start-up and for routine servicing. All adjustments and test points are to be clearly identified.
- 6. The airflow processing center must perform the following functions as required for their respective duties:
 - a. Constant pressure control of the Supply duct system.
 - b. Volumetric synchronization of the Return airflow based on the Supply airflow.
 - c. Dial reset of control point with integral LED to indicate which setpoint is in operation
 - d. Continuous monitoring of Supply and Return air volumes. Indicating meters must be independent of all other control devices and must provide direct readout of air volume (CFM) (LPS) and velocity (FPM) (MPS). These meters must be diaphragm actuated, differential pressure type and are to be flush mounted on the door of the control center. Each meter must be calibrated to an accuracy of $\pm 2\%$ of span.
 - e. Continuous monitoring of the Supply system static pressure. Indicating meters must be independent of all other control devices and must provide direct readout of system static pressure (In. W.C.) (KPa). These meters must be diaphragm actuated, differential pressure type and are to be flush mounted on the door of the control center. Each meter must be calibrated to an accuracy of $\pm 2\%$ of span.



- f. Continuous indication of controller output.
 - g. Provide for Soft Start of the system with an integral LED to indicate when the system is in the de-energized mode of operation. This interlock is to be activated by Start/Stop dry contacts provided by the Subcontractor.
 - h. Multiple system static sensing with low select to include the required indicating meters, transmitters and low select circuitry.
 - i. Summing of multiple airflow rates. Where multiple fans serve a common system, provide all necessary electronic control devices to produce an electronic control signal equal to the total air volume.
 - j. Provide High and Low duct pressure override with dry contacts for remote alarm, local light alarm, and manual reset.
 - k. Provide electronic analog output signals linear to air volume and system static pressure for remote use by the building automation system or central computer.
7. All control instruments, relays, etc. must be contained within a NEMA 13 enclosure. The enclosure(s) must be suitable for wall mounting and have a textured polyester finish.
 8. All control modules, instruments, relays, etc. must be located within the enclosure for easy servicing from the front of the cabinet with the door open. It must be the responsibility of the installer to assure that proper clearances be available to allow full opening of the control center door.
 9. All wiring connections to control instruments, relays, etc. must be made inside the enclosure. External bulkhead connections must be provided at the top or side of the control center cabinet for the connection or entry of control wiring. Bulkhead connections are to be clearly identified. All electrical connection must be terminated inside the control center at securely mounted terminal blocks. All terminal blocks are to be clearly identified.
 10. Power and logic wiring will conform to the latest National Electric Code (NEC) and recommended practices of ISA.

E. Current Switches (CS)

1. For Constant Speed Motors:
 - a. CS must be provided for status indication of constant speed motors;
 - b. Switch must indicate loss of status when current falls below an adjustable trip point;
 - c. CS must include LED indication of status;
 - d. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Veris Industries
 - 2) Hawkeye
 - 3) Kele
 - 4) Or Approved Equal
2. For Variable Speed Motors/ VFD:
 - a. Typically, status indication that indicates VSD or bypass operation must be derived from contacts on the VSD. The VSD must be specified to include this option;



- b. Otherwise, a current switch must be provided for status indication. The switch must be microprocessor based and suitable for use on a VSD;
- c. Self-adjusting trip setpoint;
- d. Factory programmed to detect belt loss undercurrent conditions;
- e. CS must include LED indication of status;
- f. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Veris Industries
 - 2) Hawkeye
 - 3) Kele
 - 4) Or Approved Equal

F. Static Pressure Transmitter

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Setra
 - b. Vaisala
 - c. Kele
 - d. Or Approved Equal

G. Binary Sensors

- 1. Water differential pressure switches suited for application.
- 2. Air differential pressure switches must be diaphragm type, die-cast aluminum housing, adjustable setpoint, with a SPDT switch. Rating must be a minimum of 5 amps at 120 VAC. Switch pressure range must be suited for the application.
- 3. Low temperature detector (Ltd) must be automatic reset, DPDT type. Ltd must be installed in a serpentine fashion across the coil in the air stream in accordance with the manufacturer's recommendations. Element must be arranged to lock out the associated fan should the temperature at any point along the sensing element fall below 35 °f for an adjustable time period.
- 4. Current sensing relays must be split core, two wire, loop powered and sized for expected amperage. Unit must be UL listed. Provide status LED's for current sensed below setpoint, current sensed above setpoint and loop power failure. The unit must automatically range itself and have solid state outputs.

H. Single Point Leak Detector

- 1. The alarm module must indicate that water has contacted the sensors by actuating two output relays. The relays must remain activated until the module is reset.

I. Control Dampers

- 1. Dampers must be applicable for the rated pressure and velocity service. Damper structural rating must exceed extreme anticipated conditions like fan deadhead.



2. Modulating dampers must be carefully selected to control in a smooth and stable fashion across the range of anticipated conditions. Except where size dictates a single blade, dampers must always be opposed blade. When a large section of damper is to be connected to a single jackshaft, size limitations must be followed. This will prevent excessive damper area or, more importantly, length from being connected to a single jackshaft. Typically, the manufacturer's recommendation must be sufficient for specifying a limit to the size of a damper bank that may have field fabricated jackshaft connections.
3. Whenever possible, dampers must have external crankshafts to allow the connection of the damper actuator outside of the air stream. This will allow for easier access to the actuators for maintenance.
4. OA control dampers must be low leakage dampers with damper seals.
5. Output to modulating control dampers must be analog.
6. Manufacturers: Ruskin, Nailor, Greenheck, approved equal.

J. Damper Actuators

1. General: Size actuators and linkages to operate their appropriate dampers or valves with sufficient reserve torque or force to provide smooth modulating action or two-position action and adequate close off rating as required.
2. Damper actuators must be electronic type, 24 VAC with spring return. Size actuator for torque requirements of damper. Provide limit switches to protect motor against burnout. Damper motor must be Belimo, Johnson Controls, Honeywell or approved equal.
3. For duct mounted dampers:
 - a. All Actuators must be electronic.
 - b. Electronic Actuators: Must be designed for a minimum of 60,000 full cycles at full torque and be UL 873 listed. Provide stroke indicator. Actuators must have a positive positioning circuit and selectable inputs. Full stroke must be within 90 seconds. Where fail positions are required, provide spring return on the actuator with adequate close off force.
 - c. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Belimo
 - 2) Honeywell
 - 3) Johnson Controls
 - 4) Or approved Equal
4. For terminal unit dampers:
 - a. Electronic Actuators: Must be designed for a minimum of 60,000 full cycles at full torque. Provide stroke indicator. Output to modulating damper actuators may be analog or floating.

K. Electric Thermostats

1. Furnish and install 24 volts thermostats for unit heaters. Thermostat contacts must be rated for maximum heater amperage and must be snap acting, SPDT.



2. Thermostat must have a concealed setpoint adjustment.
3. Thermostat must have concealed thermometer temperature indication.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

A. Installation Criteria

1. Space mounted devices are to be identical in appearance. All devices must be mounted under the same style cover.
2. Room sensors and thermostats must not be located on outside walls.
3. Provide all relays, switches, sources of electricity and all other auxiliaries, accessories and connections necessary to make a complete operable system in accordance with the sequences specified.
4. Install controls so that adjustments and calibrations can be readily made. Controls are to be installed by the control equipment manufacturer.
5. Mount surface-mounted control devices, tubing and raceways on brackets to clear the final finished surface on insulation.
6. Conceal control conduit and wiring in all spaces except in the Mechanical Equipment Rooms and in unfinished spaces. Install in parallel banks with all changes in directions made at 90 degree angles.
7. Install control valves horizontally with the power unit up. Installation of control valves will be by the Contractor.
8. Unless otherwise noted, install wall-mounted sensors, thermostats and humidistats to meet ADA requirements. Submit device samples, locations, mounting heights and details for approval for all devices.
9. All relays, electrical wiring, panels, outputs, etc. to make a complete operational system, must be provided and installed by this section. See sequences of operation for details.

B. Design Criteria

1. The Automatic Temperature Control (BMS) must be programmed to start and stop the HVAC equipment based on occupancy schedules. The BMS must also provide equipment interlocks as required.
2. Fire Alarm Interface for Fans
 - a. The Fire Alarm System (FAS) must provide outputs to notify the BMS of fire alarms.
 - b. All fan systems must be stopped from the FAS. When the fan system stops, all associated dampers must close.



3.3 ELECTRICAL INSTALLATION WIRING AND MATERIALS

- A. Provide all electrical control work associated with the BMS, HVAC and plumbing systems, which is not specified as work of other trades.
1. Perform all wiring in accordance with all local and national codes including the NEC.
 2. Install all line voltage wiring, concealed or exposed, in conduit in accordance with the Division 26 specifications, NEC and 2014 NYC Building Code. Utilize #14 A.W.G. THWN conductors minimum throughout for power wiring (120 VAC or greater) except in conjunction with a manual starter.
 3. All low voltage electrical control wiring may be run in plenum rated cable above accessible hung ceilings. Plenum cable must be run parallel to building lines and supported from the building structure (not from duct, pipe or associated hangers) with bridle rings.
 4. Provide extension of 120 volt, 20 amp circuits and circuit breakers from emergency power panels for entire system, as required.
 5. Provide all miscellaneous field device mounting and interconnecting control wiring for all mechanical systems.
 6. All control and power wiring associated with the control of all automatic, fire/smoke or smoke dampers must be installed in conduit, regardless of voltage. All control and power wiring for relays associated with the control of any automatic, fire/smoke or smoke damper must be installed in conduit, regardless of voltage.
 7. Provide electrical wall box and conduit sleeve for all wall mounted devices.
 8. Fire stopping must be provided for all penetrations of conduit, etc. through fire rated walls and floors and other fire rated separations.
 9. Where conduit is required, it must be steel electric metallic tubing (EMT), except that it must be galvanized intermediate steel conduit where located within 8'-0" of the floor in mechanical spaces (or is otherwise exposed to mechanical damage), or is intended for embedment in concrete.
 10. Wires and cables must have characteristics - in compliance with Articles 725 and/or 800 (as applicable) of the National Electrical Code - as described elsewhere in the specifications or drawings for this project, and must be UL listed in accordance therewith.

3.4 SMOKE CONTROL FAN (EF-1)

- A. Smoke control fan EF-1 must start upon activation from the fire alarm system.

3.5 ACCEPTANCE TESTING

- A. Submit for approval, a detailed acceptance test procedure designed to demonstrate compliance with contractual requirements.
- B. Demonstrate system performance to Commissioner for final system acceptance.

PART 4 - SEQUENCE OF OPERATION



4.1 VARIABLE REFRIGERANT VOLUME (VRV) SYSTEMS

- A. Refer to Section 238129 “Variable Refrigerant Flow HVAC System” for the factory furnished control and associated sequences. The factory furnished controls will incorporate BACnet gateway with MS/TP communication. Provide all required field wiring of controls that cannot be factory installed for proper AC unit operation. Connect the direct digital controls (DDC) controller to the NAC network for point monitoring and control from the operator interface.
- B. The unit must run according to a user definable schedule. The fan must have a user definable minimum runtime.
- C. Direct Digital Control Points (Each Indoor Unit)
 - 1. Unit Status
 - 2. Schedule
 - 3. Room Temperature
 - 4. Supply Temperature
 - 5. Return Temperature
 - 6. Drain Pan Leak Detector
- D. Direct Digital Control Points (Each Outdoor Unit)
 - 1. Unit Status
 - 2. Compressor Status

4.2 AIR-TO-AIR ENERGY RECOVERY EQUIPMENT (ERV)

- A. Refer to Section 237200 “Air-to-Air Energy Recovery Equipment” for the factory furnished control and associated sequences. The factory furnished controls must be provided with BACnet MS/TP communication. Provide all required field wiring of controls that cannot be factory installed for proper AC unit operation. Connect the Direct Digital Control controller to the NAC network for point monitoring and control from the operator interface.
- B. The unit run schedule must be interlocked with VRV system occupied schedule. The fan must have a user definable minimum runtime.
- C. The outdoor air supply from ERV must be equipped with airflow monitoring station.
- D. Direct Digital Control Points
 - 1. Unit Status
 - 2. Schedule
 - 3. Outdoor Air Temperature
 - 4. Supply Temperature
 - 5. Return Temperature
 - 6. Filter Status
 - 7. Outdoor Air Flow Rate Monitoring.



4.3 GARAGE HEATING

- A. The garage heaters (total of six) must be enabled based on winter schedule (adj). Coordinate schedule with Commissioner. The space heater thermostat must cycle heaters to maintain setpoint temperature (adj).
- B. Direct Digital Control Points
 - 1. Garage Space Temperature
 - 2. Low Temperature Alarm
 - 3. Heater failure

4.4 GARAGE SUMMER VENTILATION AND CO EXHAUST SYSTEM

- A. The garage ventilation exhaust fans VF-1 must be enabled any time the indoor temperature exceeds 85 deg F (adj.)
- B. Activate garage ventilation exhaust fans when CO/N2O concentration reaches first alarm set point. The fan must continue to run until the concentration level reaches below setpoint condition. Refer to specification section 284200 “Gas Detection and Alarm System”
- C. Make-up air louver damper MD-1 must open upon activation of garage ventilation fan VF-1 or vehicle exhaust fans (GF-1, GF-2). Damper MD-1 must be closed when neither set of fans are active.
- D. Direct Digital Control Points
 - 1. Garage Space Temperature
 - 2. CO Level-A alarm setpoint
 - 3. N2O Level-A alarm setpoint
 - 4. CO Level ppm
 - 5. N2O Level ppm
 - 6. Fan (VF-1) Status
 - 7. Intake Louver Damper (MD-1) status
 - 8. Exhaust Louver Damper (MD-2) status

4.5 VEHICLE EXHAUST CAPTURE SYSTEM

- A. Direct Digital Control Points
 - 1. Fan (GF-1,2) Status
 - 2. Exhaust System Common Alarm

4.6 IT CLOSET VENTILATION

- A. Direct Digital Control Points
 - 1. Fan (EF-2) Status
 - 2. High Temperature Alarm



4.7 ELEVATOR MACHINE ROOM

- A. Direct Digital Control Points
 - 1. High Temperature Alarm

4.8 MISCELLANEOUS ALARM POINTS

- A. Direct Digital Control Points
 - 1. Leak Detector – Auxiliary drain pan under each ceiling hung and floor mount AC units, five locations
 - 2. Heat Trace Common Fault
 - 3. High Level Alarm Sanitary Holding Tank (Tank is located underground outside building Refer to Site Civil Plans)

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SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Removal of existing refrigerant containing equipment,
 2. Refrigerant recovery
 3. Refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410 A:
1. Suction Lines for Heat-Pump Applications: 325 psig
 2. Hot-Gas and Liquid Lines: 325 psig
- B. All work must be performed in compliance with provisions of section 608 of 1990 US Clean Air Act and Title CFR 40, Part 82, Subpart F. and in accordance with 2014 New York City Fire Code and all other applicable NY state and Federal regulation.

1.4 BEST MANAGEMENT PRACTICES

- A. The following BMPs are recommended for management and recycle of refrigerant/CFCs:
1. Use only EPA approved refrigerant handling machines when recharging or removing refrigerants.
 2. Sell refrigerant to certified technicians or to certified reclamation facilities that will reclaim the refrigerant to its original purity specifications.
 3. Dispose of filters from CFC recapture as hazardous waste.
 4. Keep accurate records for at least 3 years.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Materials must conform to the latest edition of reference specifications and industry standards specified herein and applicable, and to pertinent codes and requirements NYC Dept. of Buildings.



1. Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and jobsite brazing of piping work.
 - C. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
 - D. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."
- 1.6 SUBMITTAL PROCEDURES:
- A. Refer to DDC General Conditions section 01 33 00 "Submittal Procedures".
- 1.7 SUBMITTALS
- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.
 - B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.
 - C. Technician Certification: Submit qualification for refrigerant technician in accordance with requirements of Title 40 CFR. Part 82, Subpart F, Article 82.161. The technician must have current Universal certification for servicing all types of equipment.
 - D. Equipment Certification: Submit certification for refrigerant recovery equipment in accordance with requirements of Title 40 CFR. Part 82, Subpart F, Article 82.162.
 - E. Field quality-control test reports.
 - F. Operation and maintenance data.
- 1.8 PRODUCT STORAGE AND HANDLING
- A. Provide factory-applied plastic end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.
 - B. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.



- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8.
- F. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
 - 4. Pressure Rating: Factory test at minimum 500 psig
 - 5. Maximum Operating Temperature: 250 deg F

2.2 REFRIGERANTS

- A. Refrigerant: 410A
- B. Manufacturers: Subject to compliance requirements, provide products by one of the following:
 - 1. Daikin
 - 2. DuPont
 - 3. Honeywell
 - 4. Or Approved Equal

2.3 INSULATION

- A. Manufacturer:
 - 1. Armacell
 - 2. AeroFlex USA Inc
 - 3. AeroFoam USA Inc.
 - 4. Or Approved Equal.
- B. Insulation must be a flexible, closed-cell elastomeric pipe insulation. Adhesive and UV protective coating must be supplied from same as insulation manufacturer. The insulation must conform to ASTM C534 Grade 1, Type I.
- C. Insulation materials must have a closed cell structure to prevent moisture from wicking which makes it an efficient insulation.
- D. Insulation materials must be manufactured without the use of CFC's, HFC's or HCFC's. It is also formaldehyde free, low VOCs, fiber free, dust free and resists mold and mildew.
- E. Insulation materials must have a flame-spread index of less than 25 and a smoke-developed index of less than 50 as tested in accordance with ASTM E 84. In addition, the products, when tested, must not melt or drip flaming particles, and the flame must not be progressive.
- F. Insulation materials must have a maximum thermal conductivity of 0.27 Btu-in./h-ft²-°F at a 75°F mean temperature as tested in accordance with ASTM C 177 or ASTM C 518.
- G. Insulation materials must have a maximum water vapor transmission of 0.08 perm-inches when tested in accordance with ASTM E 96, Procedure A.

- H. All low temperature lines (+10°F and below) must be insulated with a minimum of 1-1/2" wall thickness minimum in compliance with NYCECC 2016.

2.4 LINE SET COVERS

- A. Provide line set covers complete with fittings and fasteners.
- B. Line set covers must be constructed for superior corrosion & scratch resistance. The duct and fittings must be triple hot dip protected with layers of zinc, aluminum and magnesium for much greater protection than ordinary galvanized steel.
- C. All fasteners must be stainless steel
- D. Basis of Design Product: Subject to compliance with requirements, provide products by Inaba Denko America, RD Series or comparable product by one of the following:
 - 1. Rectorseal
 - 2. Diversitech
 - 3. Approved Equal.

2.5 PROTECTIVE COATINGS

- A. Provide water based latex pliant enamel coating for all outdoor exposed refrigerant insulation for durable weather resistance to ultraviolet and ozone deterioration.
- B. Coating must be heavy bodied, easy brush application suitable for application above 50 deg F , non-flammable with VOC content less than 10 grams/liter
- C. Protective coating must be from same manufacturer as insulation.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING APPLICATIONS

- A. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping and system components according to latest edition of ASHRAE 15 and Chapter 11 of 2014 NYC Mechanical code including but not limited to the following requirements:



1. All piping that crosses open space that affords passageways must be installed minimum 7 feet 3 inches above finished floor or tight ceiling slab of open passageways.
 2. All piping installed below 7 feet 3 inches must be protected from mechanical damage.
 3. Refrigerant piping in public corridor must be brazed joints of manufacturer provided pre-charged tubing systems with no joints.
 4. Refrigerant piping and fittings must be concealed or otherwise protected from mechanical damage.
 5. Refrigerant piping must not be installed in enclosed public stairway, stair landing or exit.
 6. All refrigerant piping must be insulated to avoid condensation and meet requirements of thermal insulation for compliance with energy code.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 2. Install horizontal suction lines with a uniform slope downward to compressor.
 3. Install traps and double risers to entrain oil in vertical runs.
 4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.



- P. Install pipe sleeves at penetrations in exterior walls and floor assemblies.
- Q. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."
- R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- S. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.
- T. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.

3.4 PIPE JOINT CONSTRUCTION

- A. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 - 1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.

3.5 PIPING INSULATION INSTALLATION

- A. Refrigerant Installation
 - 1. All refrigerant copper lines must be free of extraneous chemicals such as corrosive cleaners or building materials' dust prior to the installation of the insulation. The insulation must be clean and dry prior to installation.
 - 2. Refrigerant pipe must be sealed while slipping on insulation to prevent foreign matter from entering the tube.
 - 3. Insulation is to be slid onto pipe; longitudinal slitting of the insulation is not allowed except on mitered sections. Insulation must be pushed onto pipe, not pulled.
 - 4. Insulation must be mitered, pre-adhered and longitudinally slit inside throat to fit over all P-traps, tees and elbows or bends over 90°.
 - 5. All butt joints and mitered seams must be adhered with full coverage of adhesive on both surfaces. Insulation must not be stretched when adhering.
 - 6. Insulation must be installed in an adequately ventilated area. It may be necessary to increase insulation thickness if adequate ventilation is not present, Do not crowd the insulation, allow for adequate air movement.
 - 7. At the beginning, at every 12 to 18 feet, and at the ends of piping runs, the insulation must be adhered directly to the copper using a 2" strip of adhesive. Insulation should not be adhered to the pipe at the extreme low points in any piping run.



8. Saddles must be installed under all insulated lines at unistrut clamps, clevis hangers, or locations where insulation may be compressed.
 - a. Insulation pipe hangers can be installed at the compression locations and the seams must be sealed with contact adhesive.
 - b. To minimize the movement of it is recommended that a pair of non-skid pads be adhered to the clamps. In addition, to prevent loosening of the clamps, use of an anti-vibratory fastener, such as a nylon-locking nut, is also recommended.
 - c. Wood dowels or blocks, of a thickness equal to the insulation, can be inserted and must be completely sealed into the insulation at the saddle locations. All seams must be sealed with contact adhesive.
 - d. Hangers clamped directly to the pipe must be insulated over the hanger; insulation must be fully adhered to the hanger. In addition, hangers with double rods must be insulated between the rods. All seams of the insulation must be sealed with adhesive.
 - e. All insulation exposed to sunlight or installed outdoors must be protected with UV protective coating.

3.6 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
 1. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
 1. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch .
 2. NPS 1: Maximum span, 72 inches minimum rod size, 1/4 inch.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 1. Comply with ASME B31.5, Chapter VI.
 2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System must maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials and retest until satisfactory results are achieved.



3.8 SYSTEM CHARGING

- A. Charge system using the following procedures:
1. Install core in filter dryers after leak test but before evacuation.
 2. Evacuate entire refrigerant system with a vacuum pump to 500 microns Hg. If vacuum holds for 12 hours at ambient temperatures of 60°F, system is ready for charging.
 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
 4. Charge system with a new filter-dryer core in charging line.

3.9 REFRIGERANT HANDLING

- A. Contractor must follow provisions outlined in section 608 of the 1990 US Clean Air Act and Title 40 CFR, Part 82, Subpart F for safe handling and disposal of Class I and Class II refrigerants to include but not limited to:
1. Refrigerant technician certification
 2. Refrigerant recovery equipment certification
 3. Appliance or equipment evacuation vacuum levels
 4. Hazardous materials manifest reporting and record keeping.
 5. Safe disposal of refrigerants
- B. In event of accidental release of refrigerant, the contractor must follow the procedures for reporting release of hazardous materials in accordance with NYC Fire Code, section 606.13, other applicable NY State and Federal Regulations.

3.10 ADJUSTING

- A. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
1. Verify that compressor oil level is correct.
 2. Open compressor suction and discharge valves.
 3. Open refrigerant valves except bypass valves that are used for other purposes.

3.11 REPORTING

- A. Contractor must prepare a Certificate of Test in accordance with 2014 NYC Building Code, Section 1108.4
- B. Submit final report to the Commissioner

END OF SECTION 23 23 00

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. Round and oval ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.

B. Related Sections:

1. Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC"
2. Section 23 33 00 "Air Duct Accessories"

1.3 PERFORMANCE REQUIREMENTS

- A. Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, must comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports must withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"
- C. Airstream Surfaces: Surfaces in contact with the airstream must comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of product indicated.
- C. Submittals:
 - 1. Documentation indicating that duct systems comply with ASHRAE 62.1-2007, Section 5 - "Systems and Equipment."
 - 2. Documentation indicating that duct systems comply with ASHRAE/IESNA 90.1-2007, Section 6.4.4 - "HVAC System Construction and Insulation."
 - 3. Documentation of work performed for compliance with ASHRAE 62.1-2007, Section 7.2.4 - "Ventilation System Start-Up."
 - 4. For adhesives and sealants, including printed statement of VOC content.
- D. Shop Drawings:
 - 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 - 2. Factory- and shop-fabricated ducts and fittings.
 - 3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
 - 4. Elevation of top of ducts.
 - 5. Dimensions of main duct runs from building grid lines.
 - 6. Fittings.
 - 7. Reinforcement and spacing.
 - 8. Seam and joint construction.
 - 9. Penetrations through fire-rated and other partitions.
 - 10. Equipment installation based on equipment being used on Project.
 - 11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
 - 12. Hangers and supports, including methods for duct and building attachment and vibration isolation.
- E. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
 - 2. Suspended ceiling components.
 - 3. Structural members to which duct will be attached.



4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

F. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
 3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2007, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up"
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2007, Section 6.4.4 - "HVAC System Construction and Insulation"

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."



- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND AND FLAT-OVAL DUCTS AND FITTINGS

- A. All round and /or flat oval ducts must be factory fabricated spiral duct and fittings. All spiral duct and fittings must be manufactured by same company who has been in business for at least 3 years. Duct construction must comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow LLC.
 - c. SEMCO Incorporated.
 - d. Spiral Manufacturing Co., Inc.
 - e. Or Approved Equal
- B. Branch connections must be made with 90° conical and 45° straight taps as shown on the drawings. All branch connections must be made as a separate fitting. Factory or field installation of taps into spiral duct must not be allowed without written approval of the Commissioner. Manufacturer's published individual fitting performances must be included in the submittal.
- C. All elbows must be fabricated with a centerline radius of 1.5 times the diameter. 90° and 45° elbows in diameters 3" round through 12" round must be stamped or pleated elbows. All other elbows must be of the gored type, fabricated in accordance with the following: 2 gores less than 36°, 3 gores for 37° thru 71°F and 5 gores for 72° thru 90°.
- D. Circumferential and longitudinal seams of all fittings must be a continuous weld or spot welded and sealed with mastic. All welds must be painted to prevent corrosion.
- E. All field joints for round ducts up to and including 36" diameter and oval ducts up to and including 41" major axis must be made with a 2" slip-fit or slip coupling. Diameters 38" round and larger must be provided with flanged connections. Flanged connections may also be used in lieu of slip connections on smaller sizes. Access doors must be supplied by the duct manufacturer at all fire and/or smoke dampers. All flanges and access doors must be factory installed. Shipments of loose flanges, access doors, or taps for field installation into spiral duct will not be allowed.
- F. All flat oval duct must be reinforced with trapeze type reinforcement, as recommended by the manufacturer, to limit wall deflection to 3/4" and reinforcement deflection to 1/4".
- G. Metal gauges for single wall round and flat oval duct must be as follows:



1. Spiral Duct for positive pressure & negative pressure

Diameter	Galvanized Sheet Steel Metal Gauges			
	+ 4 in wg	+10" wg	- 4 in wg	-10" wg
3" thru 16"	26	26	24	22

2. Solid spiral seam inner must be 24 for duct sizes up to 20 inches and 20 gauge for larger ducts.

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials must be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 1. Galvanized Coating Designation: G90
 2. Ducts to be painted must have mill phosphatized coating. Refer to architectural drawings and specifications to coordinate sections to be painted.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish must be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- E. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.
- F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches

2.4 VEHICLE EXHAUST SYSTEM DUCTWORK

- A. Type 316L Stainless Steel
- B. Duct Construction



1. Round ducts and fittings: Longitudinal seam 316L 16 gauge stainless steel for all sizes with welded seams and fitting joints.
2. Rectangular ducts and fittings: 316L 16 gauge stainless steel for all sizes conforming to medium pressure duct reinforcing requirements. Form duct with only one longitudinal welded seam.
3. All stainless steel joint construction to be continuously butt welded (use appropriate filler rod) using Surface Tension Power (STT) system with 10 percent CO2 shielding gas. Welding must be done by a welder certified to butt weld 16 gauge 316L or 304 stainless steel. Welding and welding certification must be in accordance with AWS 1964. Exterior welds on exposed ducts to be ground smooth. Identify field welds on shop drawings and provide access for field inspection of same.
4. Provide specified flanged joints with gaskets and mastic where there is no room for welding and/or where shown on Drawings, only where approved in advance by the Commissioner. There may be no more than 5 percent flanged joints out of joints, including shop and field welded joints.
5. Provide welded-in stainless steel threaded nipples where required for pipe connections such as for drains, storage cabinet vents, etc.
6. Finished stainless steel items must have edges, joints and welds ground smooth and have a mill finish. There are to be no visible weld marks, discoloration, or scratches.

2.5 DUCT LINER

- A. Liner must be limited to ductwork indicated on plans.
- B. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Insulation Group.
 - b. Johns Manville.
 - c. Knauf Insulation.
 - d. Owens Corning.
 - e. Or Approved Equal
 2. Maximum Thermal Conductivity:
 - a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F (24 deg C) mean temperature.
 - b. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F (24 deg C) mean temperature.
 3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound must be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.



4. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - a. Use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Insulation Pins and Washers:
 1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- D. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."
 1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 3. Butt transverse joints without gaps, and coat joint with adhesive.
 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
 7. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
 8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
 9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.



- a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets must be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 4 inches
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 7. Service: Indoor and outdoor.
 8. Service Temperature: Minus 40 to plus 200 deg F
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
 1. Application Method: Brush on.
 2. Solids Content: Minimum 65 percent.
 3. Shore A Hardness: Minimum 20.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
 8. Service: Indoor or outdoor.



9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal must provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and must be rated for 10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.7 HANGERS AND SUPPORTS

A. Hanger Rods for Non-corrosive Environments: Electro galvanized steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

D. Steel Cables for Stainless-Steel and Aluminum Ducts: Stainless steel complying with ASTM A 492.

E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

G. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.



2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or stainless steel

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round/oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."



3.3 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Restore or replace damaged sections and finished work that does not comply with these requirements.

3.4 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class B.
 - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class A.
 - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
 - 11. Conditioned Space, Exhaust Ducts: Seal Class B.
 - 12. Conditioned Space, Return-Air Ducts: Seal Class C.



3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 DUCT CLEANINESS

- A. All ductwork openings must be taped closed with polyethylene when delivered to site. All installed hung ducts openings must be protected from construction dust. All open end return duct opening must be protected until ready for use.
- B. Clean the following components by removing surface contaminants and deposits:
 - 1. Air outlets and inlets (registers, grilles, and diffusers).



2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 4. Coils and related components.
 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
 6. Supply-air ducts, dampers, actuators, and turning vanes.
 7. Dedicated exhaust and ventilation components and makeup air systems.
- C. Provide temporary MERV 11 construction filters and run continuously for 48 hours to clean system of construction debris or dust.

3.8 GALVANIZING RESTORATION

- A. Restore galvanizing damaged by welding, scratches, etc., cold galvanizing compound.

3.9 DUCT AND PLENUM LEAK TESTING (VEHICLE EXHAUST CAPTURE SYSTEM)

- A. Leak test 100% of ducts and plenums: Use extreme care in the fabrication and installation of the ductwork and plenums to ensure that it will be airtight. Test ductwork and plenums for leaks in sections as the work progresses before insulating. Fire dampers, smoke/fire dampers, access panels and appropriate branch ducts must be in place during the testing. Seal off open ends and then test by the following.
1. Duct Leak Test for Medium Pressure ductwork: The equipment required for this testing comprises a high pressure blower, orifice test pipe assembly and manometer with necessary valves and tubing. The ductwork section must be placed under an air pressure of 6 inches of water with the blower, while leakage flow through the orifice is measured on the manometer. The manometer readings must be converted to CFM from a calibrated test curve. The leakage must not exceed 6 CFM/100 s.f. for rectangular seal class "A" ductwork and 3 CFM/100 sf for round seal class "A" ductwork. No less than 50 square feet of duct must be tested at one time. Provide test conditions, including the total square feet of ductwork under test. Fire dampers and access panels must be installed. Testing of complete sections of the ductwork must be made before installation of the finished ceiling or before the ductwork is furred in inaccessible space, and must be witnessed by the Commissioner. Leaks found must be fixed, or joints remade and the section retested until tight. Leaks that cause objectionable noise must be fixed, regardless of the amount of the leakage. Maintain a set of Drawings for recording and sign off of each tested section. After completion of testing, turn drawings over to the Commissioner.
 2. Duct leak test for welded ducts: The duct section under test must be pressurized to 7 inches (177 mm) w.g. and the air "locked-in" to the duct. The pressure will be allowed to fall to 5 (125 mm) of water for an average of 6 inches (150 mm) of water. The time in seconds must be measured for this drop in duct pressure. Leakage must not exceed 0.1 cubic feet per minute per 100 square feet of surface area. The time, in seconds, that is



equivalent to this leakage rate is found by the formula $t = \text{duct I.D.} \times 6.23$. The duct inside diameter must be in inches. Test entire duct run. Test from the fume hood collar to the fume exhaust plenum of fan inlet flexible connection.

3. Leak Test for Fume Exhaust Plenums: Same as for medium pressure ductwork, except leakage rate must not exceed 0.1 CFM/100 square feet of plenum surface area.

3.10 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

- A. Supply, Return or Exhaust Ducts:

1. Ducts Connected to Air-Conditioning Units, Return Fans and Exhaust Fans
 - a. Material: Galvanized Steel
 - b. Pressure Class: Positive or negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: A
 - d. SMACNA Leakage Class for Rectangular: 6
 - e. SMACNA Leakage Class for Round and Flat Oval: 6

- B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.
2. Aluminum Ducts: Aluminum.

- C. Liner:

1. Supply and Return: Fibrous glass, Type I, thickness minimum 1 inch unless otherwise noted on plans.
2. Supply and Return Serving Venue Hall: Fibrous glass, Type I, thickness minimum 2 inch unless otherwise noted on plans.
3. Transfer Ducts: Fibrous glass, Type I, thickness minimum 1-1/2 inch unless otherwise noted on plans.

- D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.



- c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Radius-to Diameter Ratio: 1.5
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
- E. Branch Configuration:
 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
 2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are not permitted.
 - a. Velocity 1500 fpm or Lower: Conical tap.
 - b. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

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SECTION 23 33 00

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Backdraft and pressure relief dampers.
 2. Manual volume dampers.
 3. Control dampers.
 4. Fire dampers.
 5. Flange connectors.
 6. Turning vanes.
 7. Duct-mounted access doors.
 8. Flexible connectors.
 9. High temperature flexible connectors
 10. Duct accessory hardware.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control damper installations.
 - d. Fire-damper and smoke-damper installations, including sleeves; and duct-mounted access doors.
 - e. Wiring Diagrams: For power, signal, and control wiring.
- D. Operation and maintenance data.



1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- C. Comply with AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials must be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90
 - 2. Exposed-Surface Finish: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and for exposed ducts.
- D. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Air Balance Inc.; a division of Mestek, Inc.
 - 2. American Warming and Ventilating; a division of Mestek, Inc.
 - 3. Duro Dyne Inc.
 - 4. Greenheck Fan Corporation.
 - 5. Nailor Industries Inc.
 - 6. Ruskin Company.
 - 7. Or Approved Equal



- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 2000 fpm
- D. Maximum System Pressure: 2-inch wg
- E. Frame: 0.052-inch- (1.3-mm-) thick, galvanized sheet steel, with welded corners and mounting flange.
- F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch width, 0.025-inch-thick, roll-formed aluminum noncombustible, tear-resistant, neoprene-coated fiberglass with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Neoprene, mechanically locked.
- I. Blade Axles:
 - 1. Material: Aluminum.
 - 2. Diameter: 0.20 inch
- J. Tie Bars and Brackets: Aluminum
- K. Return Spring: Adjustable tension.
- L. Bearings: Steel ball.
- M. Accessories:
 - 1. Adjustment device to permit setting for varying differential static pressure.
 - 2. Counterweights and spring-assist kits for vertical airflow installations.
 - 3. Electric actuators.
 - 4. Chain pulls.
 - 5. Screen Mounting: Front mounted in sleeve.
 - a. Sleeve Thickness: 20-gage minimum.
 - b. Sleeve Length: 6 inches minimum.
 - 6. Screen Mounting: Rear mounted.
 - 7. Screen Material: Aluminum.
 - 8. Screen Type: Bird
 - 9. 90-degree stops.

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. Nailor Industries Inc.
 - d. Pottorff; a division of PCI Industries, Inc.



- e. Ruskin Company.
 - f. Or Approved Equal
 2. Standard leakage rating, with linkage outside airstream.
 3. Suitable for horizontal or vertical applications.
 4. Frames:
 - a. Hat-shaped, galvanized-steel channels, 0.064-inch (1.62-mm) minimum thickness.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized steel, 0.064 inch (1.62 mm) thick.
 6. Blade Axles: Galvanized steel.
 7. Bearings:
 - a. Molded synthetic
 - b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less must have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Galvanized steel.
- B. Standard, Aluminum, Manual Volume Dampers:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. Nailor Industries Inc.
 - d. Pottorff; a division of PCI Industries, Inc.
 - e. Ruskin Company.
 - f. Or Approved Equal
 2. Standard leakage rating, with linkage outside airstream.
 3. Suitable for horizontal or vertical applications.
 4. Frames: Hat-shaped, 0.10-inch- (2.5-mm-) thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Roll-Formed Aluminum Blades: 0.10-inch- (2.5-mm-) thick aluminum sheet.
 - e. Extruded-Aluminum Blades: 0.050-inch- (1.2-mm-) thick extruded aluminum.
 6. Blade Axles: Galvanized steel
 7. Bearings:
 - a. Molded synthetic
 - b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less must have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Aluminum.
- C. Jackshaft:
 1. Size: 1-inch (25-mm) diameter.



2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

D. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.4 FIRE DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. Greenheck Fan Corporation.
3. Nailor Industries Inc.
4. Ruskin Company.
5. Or Approved Equal

B. Type: Static and dynamic; rated and labeled according to UL 555 by an NRTL.

C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 4000-fpm velocity.

D. Fire Rating: 1-1/2 hours.

E. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

F. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.

1. Minimum Thickness: 0.052 thick, as indicated, and of length to suit application.
2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.

G. Mounting Orientation: Vertical or horizontal as indicated.

H. Blades: Roll-formed, interlocking, 0.034-inch thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch thick, galvanized-steel blade connectors.

I. Horizontal Dampers: Include blade lock and stainless-steel closure spring.

J. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.

K. Heat-Responsive Device: Electric resettable link and switch package, factory installed, 165 deg F rated where noted on plans



2.5 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ductmate Industries, Inc.
 - 2. Nexus PDQ; Division of Shilco Holdings Inc.
 - 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
 - 4. Or Approved Equal
- B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.6 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
 - 4. Or Approved Equal
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."
- D. Vane Construction: Single wall.

2.7 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Warming and Ventilating; a division of Mestek, Inc.
 - 2. Ductmate Industries, Inc.
 - 3. Greenheck Fan Corporation.
 - 4. Nailor Industries Inc.
 - 5. Pottorff; a division of PCI Industries, Inc.
 - 6. Or Approved Equal
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."



1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel, where noted on plans.
 - d. Hinges and Latches: 1-by-1-inch (25-by-25-mm) butt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches (300 mm) Square: No hinges and two sash locks.
 - b. Access Doors up to 18 Inches (460 mm) Square: Two hinges and two sash locks.
 - c. Access Doors Larger Than 24 by 48 Inches (600 by 1200 mm): Four hinges and two compression latches with outside and inside handles.

2.8 DUCT ACCESS PANEL ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ductmate Industries, Inc.
 2. Flame Gard, Inc.
 3. 3M.
 4. Or Approved Equal
- B. Labeled according to UL 1978 by an NRTL.
- C. Panel and Frame: Minimum thickness 0.0528-inch carbon steel.
- D. Fasteners: Carbon steel. Panel fasteners must not penetrate duct wall.
- E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F (1093 deg C).
- F. Minimum Pressure Rating: 10-inch wg (2500 Pa), positive or negative.

2.9 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. Ventfabrics, Inc.
 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
 5. Or Approved Equal
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.



- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
 - 2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
 - 1. Minimum Weight: 24 oz./sq. yd. (810 g/sq. m).
 - 2. Minimum Tensile Strength: 500 lbf/inch (88 N/mm) in the warp and 440 lbf/inch (77 N/mm) in the filling.
 - 3. Service Temperature: Minus 50 to plus 250 deg F (Minus 45 to plus 121 deg C).
- G. High Temperature Flexible Fabric Connector: Teflon coated Fiberglass/ Satin Weave
 - 1. Minimum Weight: 17 oz./sq. yd. (810 g/sq. m).
 - 2. Minimum Tensile Strength: 400 grab pounds per Federal Standard 191 Method #5100.
 - 3. Pressures: Suitable for pressure of -10 in wc to +15 inch wc.
 - 4. Service Temperature: Minus 150 to plus 500 deg F.
- H. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
 - 1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
 - 2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 - 7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch (6-mm) movement at start and stop.

2.10 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.



PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire dampers according to UL listing.
- H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. On both sides of duct coils.
 - 2. Upstream and downstream from duct filters.
 - 3. At outdoor-air intakes and mixed-air plenums.
 - 4. At drain pans and seals.
 - 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 - 6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links must be pressure relief access doors; and must be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - 7. At each change in direction and at maximum 50-foot (15-m) spacing.
 - 8. Upstream and downstream from turning vanes.
 - 9. Control devices requiring inspection.
 - 10. Elsewhere as indicated.
- I. Install access doors with swing against duct static pressure.



- J. Access Door Sizes:
 - 1. One-Hand or Inspection Access: 8 by 5 inches.
 - 2. Two-Hand Access: 12 by 6 inches.
- K. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- L. Install flexible connectors to connect ducts to equipment.
- M. For fans developing static pressures of 4-inch wg (1250 Pa) and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- N. Connect terminal units to supply duct directly or with maximum 8-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- O. Connect diffusers or light troffer boots to ducts directly or with maximum 24-inch lengths of flexible duct clamped or strapped in place.
- P. Connect flexible ducts to metal ducts with draw bands
- Q. Install duct test holes where required for testing and balancing purposes.
- R. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Operate fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
 - 4. Inspect turning vanes for proper and secure installation.

END OF SECTION 23 33 00

SECTION 23 34 16

HVAC FANS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes the following:
1. Ceiling Mounting Ventilators
 2. Upblast Centrifugal Exhaust Fans
 3. Inline fans

1.3 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan performance ratings on actual Project site elevations above sea level.
- B. Operating Limits: Classify according to AMCA 99.

1.4 REFERENCES:

- A. AMCA 99, "Standards Handbook"
- B. ANSI/AMCA Standard 204-96, "Balance Quality and Vibration Levels for Fans"
- C. ANSI/AMCA Standard 210-99, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating"
- D. AMCA Publication 211-05, "Certified Ratings Program - Product Rating Manual for Fan Air Performance"
- E. AMCA Standard 300-96, "Reverberant Room Method for Sound Testing of Fans"
- F. AMCA Publication 311-05, "Certified Ratings Program - Product Rating Manual For Fan Sound Performance"
- G. AMBA - Method of Evaluating Load Ratings of Bearings ANSI-11 (r1999).
- H. OSHA guideline 1910.212 - General requirements for Machine Guarding. (www.osha.gov)



- I. OSHA guideline 1926.300 - General requirements for safe operation and maintenance of hand and power tools. (www.osha.gov)
- J. OSHA guideline 1910.219 - General requirements for guarding safe use of mechanical power transmission apparatus. (www.osha.gov)
- K. UL Standard 705, "Power Ventilators"

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
 - 1. Certified fan performance curves with system operating conditions indicated.
 - 2. Certified fan sound-power ratings.
 - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 4. Material thickness and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- D. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For centrifugal fans to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100 and marked for intended use.
- C. AMCA Compliance: Products must comply with performance requirements and must be licensed to use the AMCA-Certified Ratings Seal.
- D. NEMA Compliance: Motors and electrical accessories must comply with NEMA 1.



1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.8 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 07 71 00 "Roof Specialties."

PART 2 - PRODUCTS

2.1 CEILING-MOUNTING VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panasonic
 - 2. Greenheck
 - 3. Loren Cook Company.
 - 4. Or Approved Equal
- B. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.
- C. Housing: Steel, lined with acoustical insulation.
- D. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel must be removable for service.
- E. Grille: Manufacturer's standard painted aluminum or plastic louvered grille with flange on intake and thumbscrew attachment to fan housing.
- F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- G. Accessories:
 - 1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.



2. Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
3. Isolation: Rubber-in-shear vibration isolators.
4. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.2 SIDEWALL FAN

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Greenheck
 2. Loren Cook Company
 3. Chicago Blower Corporation
 4. Or Approved Equal
- B. General Description
 1. Fan arrangement must be either supply or exhaust, as noted on plans
 2. Sidewall mounted applications
 3. Maximum continuous operating temperature 130 Fahrenheit
 4. Each fan must bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number
- C. Wheel:
 1. Propeller must be aluminum blade riveted to steel hub
 2. A standard square key and set screw or tapered bushing must lock the propeller to the motor shaft
 3. Statically and dynamically balanced in accordance with AMCA Standard 204-05
 4. The propeller and fan inlet will be matched and must have precise running tolerances for maximum performance and operating efficiency
- D. Motors
 1. Motor must be electronically commutated motor.
- E. Drive Frame
 1. Drive frame assemblies and fan panels must be galvanized steel
 2. Drive frame must have welded wire or formed channels and fan panels must have pre-punched mounting holes, formed flanges and a deep formed one piece inlet venture
- F. Disconnect Switches:
 1. Factory Mounted and Shipped loose for field mounting, National Electrical Manufacturers Association (NEMA):
 2. NEMA 1: indoor application no water.
- G. Accessories
 1. Damper:



- a. Type: Gravity
 - b. Prevents outside air from entering back into the building when fan is off
 - c. Balanced for minimal resistance to flow
 - d. Galvanized frames with pre-punched mounting holes
2. Damper Guards
 - a. Guard material: Aluminum
 - b. Must completely enclose the damper or wall opening on the discharge side of the fan
 3. Wall Housing
 - a. Mounting arrangement: Flush Exterior
 - b. Constructed of galvanized steel with heavy gauge mounting flanges and pre-punched mounting holes
 - c. Housing must include OSHA approved motor guard
 - d. Reduces installation time and provides maximum installation flexibility
 4. Finishes: Electrostatically applied thermosetting polyester urethane. Minimum dry film thickness to be 2 mils.

2.3 INLINE FAN

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Greenheck
 2. Loren Cook Company
 3. Chigo Blower Corporation
 4. Or Approved Equal
- B. Inline fans must be of the tube axial type with cast aluminum airfoil propellers. The housing must be constructed of welded construction and include integral punched inlet and outlet flanges to prevent air leakage.
- C. Fan must be class B spark resistant construction.
- D. The housing and motor mount must be constructed to prevent vibration.
- E. All inline fans must be capable of field transitions from horizontal to vertical for either base mounted or ceiling hung configurations.
- F. Propellers must be cast aluminum airfoil design. A tapered bushing must lock the propeller to the motor shaft. Propellers to be dynamically balanced. Hubs must be two-piece aluminum castings that securely lock the blades in place.
- G. Steel housings and structural components to be coated with an electrostatically applied thermosetting polyester urethane. Minimum dry film thickness to be 2 mils.
- H. Fan performance must be based on tests conducted in accordance with AMCA Standard 210. All fans must be licensed to bear the AMCA Certified Ratings Seal for Air Performance.



- I. Motors must be totally enclosed fan cooled, matched to the fan load and furnished at the specified voltage, phase and enclosure and efficiency. Motors must be readily accessible for maintenance.
- J. Motor must be NEMA premium efficiency.
- K. Provide spring and neoprene type vibration isolators.
- L. Provide unfused starter disconnect switch.

2.4 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install fans level and plumb.
- B. Support floor-mounting units using spring isolators having a static deflection of 1 inch. Vibration-control devices are specified in Section 23 05 48 "Vibration and Seismic Control for HVAC."
 - 1. Secure vibration controls to support steel.
- C. Support suspended units from structure using threaded steel rods and spring hangers having a static deflection of 1 inch. Vibration-control devices are specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC".
- D. Install units with clearances for service and maintenance.
- E. Label fans according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

3.3 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct



connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."

- B. Install ducts adjacent to fans to allow service and maintenance.
- C. Install line-sized piping from scroll drain connection, with trap with seal equal to 1.5 times specified static pressure, to nearest floor drain.
- D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to specification Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Adjust belt tension.
 - 6. Verify lubrication for bearings and other moving parts.
 - 7. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 8. Refer to Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
 - 9. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 23 34 16

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SECTION 23 35 16

ENGINE EXHAUST SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Vehicle Exhaust Capture System

1.3 SYSTEM DESCRIPTION

- A. Complete exhaust system including the exhaust fan, control box, ductwork, and extraction unit must be proven, and field tested for a minimum of three years. All system components must be labeled with manufacturer identification.
- B. The scope includes all engineering specifications, installation, operating instruction, and warranty for an Emergency Vehicle Exhaust Extraction System. Any deviations from this specification must be noted.
- C. The function of the vehicle exhaust removal system will be to source capture 100% of the exhaust emissions directly at the tail pipe of the vehicle and exhaust those emissions to a specified area safely outside the building.
- D. The exhaust system must not interfere with access to the vehicle, nor impede doorways/walkways/or exits that would endanger the welfare of personnel. Drooping loops of hose or the hose assembly touching the floor will not be permitted.
- E. As safety to personnel is of the utmost importance, the system must be so designed as not to whip or fly back into quarters upon disconnection. Vehicles must be capable of exiting quarters at normal speed without causing damage to the system or taking any portion of the hose or nozzle assembly along with the exiting vehicle.
- F. The fan must automatically start prior to vehicle ignition.
- G. The exhaust system must move with the vehicle in a forward or reverse direction of travel and have an automatic release design without any positive locking device or air bladder that clamps or binds to the tail pipe. No system that uses the vehicles tailpipe, as a pulling force will be considered.
- H. The exhaust system must utilize a minimum 5" or 6" diameter hose in order to ensure that the exhaust system can accommodate vehicle apparatus checks; and not limited to just emergency

departures. Any smaller hose does not offer the required cross-sectional area considered adequate for the volume of hot exhaust fumes discharged during extended run times required during routine vehicle check procedures.

- I. Submittal must be accompanied by a set of detailed specifications, which describe the proposed System and equipment in the same sequence as this specification for ease of comparison.
- J. The exhaust system must attach directly to tailpipe. A general room ventilation method of ceiling and air cleaner must not be accepted. Only a source capture system protects the users from harmful diesel fumes.

1.4 SYSTEM OPERATION

- A. The auto-disconnect exhaust system must be a 24-volt electromagnetic release type that captures 100% of the exhaust emissions directly from the tail pipe and discharges those emissions to a specific location by means of an exhaust fan. Upon emergency dispatch of the vehicle, the exhaust fan must automatically start prior to the engine being energized. The exhaust fan must remain in the “on” position for as long as any engine is running. Upon vehicle exit, the hose assembly remains connected to the tail pipe and automatically disconnects at a specified distance outside the door by de-energizing the electromagnet. The nozzle and hose assembly must smoothly separate from the vehicle and safely retract to the stored position ready to connect to the vehicle upon reentry. Upon disconnection, the hose assembly must not be permitted to swing wide or touch the floor, possibly endangering personnel or apparatus. The hose must remain at the door, ready for reconnection. Once the apparatus has left the building, the fan will automatically shut down after a preset time interval.
- B. Upon return, the fan is automatically activated prior to vehicle entry and the nozzle is connected to the tail pipe in a standing position. Bending over to connect the exhaust system and expose the operator to harmful exhaust fumes is not permitted. No positive locking device or moving parts must be permitted to be connected to the tail pipe. After the vehicle has been turned off, the fan can continue to operate for a preset time interval, normally two minutes.

1.5 SCOPE OF WORK

- A. Contractor must furnish and install a Source Capture Emergency Vehicle Exhaust Extraction System as designed and specified for the station(s).
- B. The Contractor must provide and install a centrifugal exhaust fan with capacity for all connected vehicles and sized for expansion if specified.
- C. The Contractor must provide and install an automatic fan start control console. The control console and all internal components must be UL listed and manufactured in accordance with UL standard 508A and bear the UL label.
- D. The Contractor must provide and install all ductwork.
- E. The Contractor must be responsible for the delivery, safe storage, and handling of the products and protect them from weather elements.

1.6 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. The following submittals and code compliance must be required.
 - 1. Record building dimensions, note vehicle type and prepare shop drawings that include: equipment position, dimensions, sizes, weights, performance data, and also location and size of field connections.
 - 2. Product Data: Provide manufacturer's literature and data sheets indicating rating capacities, dimensions, weights, accessories, and electrical requirements, wiring diagrams, location and size of field connections.
 - 3. Provide fan curves with specified operating point clearly plotted.
 - 4. Submit fan sound level data for fan specified.
 - 5. Manufacturer's Installation, Operation and Maintenance Manual, which outlines the procedures required for system installation, start up, operation and shut down. The instructions must include the manufacturer's name, telephone number, model number, service manual number, parts list, and brief description of all equipment and the basic operating features. The maintenance instructions must list routine maintenance procedures and troubleshooting guide.
- C. Certifications: International Quality System Standard ISO 9001 and ISO 14001 Certified. UL Certification: UL listing, 508A Industrial Control Panel bulletin. Compliance with: NFPA 1500, Chapter 7-1.6, 2000 International Mechanical Code 502.13, NIOSH CIB #50, OSHA, 1996 American Conference of Governmental Industrial Hygienists (ACGIH) Proposed Regulations for Benzene and Diesel Exhaust Fumes. Federal Communications Commission approvals.
- D. Compliance with all 2014 NYC Building Code American Society of Manufacturing Engineers (ASME), National Electric Code (NEC), Uniform Building Code (UBC), American Institute of Steel Construction (AISC), Sheet Metal and Air Conditioning Contractors National Association (SMACNA), American Society of Testing Materials (ASTM).
- E. Compliance must be with 2014 NY City Building Code, Fire Department of New York Standards, ASME, NEC, ASI and SMACNA.

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions 01 40 00 Quality Requirements.
- B. All workmanship, manufacturing procedures, airflow design, and materials must be tested and performance guaranteed.

1.8 EQUIPMENT WARRANTY

- A. Manufacturer’s warranty shall be minimum of three years against defects.
- B. The Contractor must guarantee all materials, equipment and workmanship for a period of one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Product: Subject to compliance with requirements, provide product of Nederman, Incorporated or comparable product by one of the following:
1. Plymovent
 2. Fume-A-Vent
 3. Approved Equal.

2.2 SYSTEM DESCRIPTION

- A. The exhaust system must be designed to vent 100 % of exhaust gases and particulate safely to the outside of the building. The exhaust system must be designed and installed by factory authorized personnel, which have been certified by the manufacturer of the exhaust system.
- B. The suction rail system is designed to be installed within 18 inches of the side of the vehicle and not take up more than 20 inches of space from the side of the vehicle and nearest obstacle. The value of this trim line approach keeps the ceiling clear of obstructions so that other items like lights and heaters can be properly located. Any suction rail system that uses more than 20 inches of space may not be accepted based on the configuration of the space.
- C. The system must be able to also be used for common maintenance inside the vehicle garage. The minimum requirement of pump checking must be for 5 minutes @ 1300 RPM. The idle time for the system must be continuous for undetermined period of time. This requirement allows the user to use the system for maintaining the vehicle pump and engine without creating unnecessary performance criteria.
- D. Suction Rail system must be used for the sole purpose of drive through or tandem bays. This type of suction rail system is for vehicle tailpipe depths over 40 ft or drive through type bays. The purpose of this type of exhaust system is to eliminate the need a long flexible hoses to carry the hot exhaust fumes, since the flexible hose is the highest wear item in the exhaust system. The rail design must be capable of handling up to 3 vehicles parked in tandem.
- E. Exhaust system must be designed to eliminate vehicle exhaust gases by a continuance of negative pressure from vehicle tailpipe to the outside of vehicle garage. This exhaust system must pull hot exhaust gases into the connection nozzle by inducing ambient air without the need of an airtight seal at vehicle tailpipe. The system must be designed entirely for a negative pressure vacuum method of exhaust extraction at no point in exhaust system will ducting be under positive pressure created by output of vehicle engine. Systems that allow for positive pressure generated by vehicle engine must not be accepted.
- F. Exhaust system hose drops must be sized to maintain a larger cross sectional diameter than vehicle tailpipe. Exhaust systems, which do not size hose drops in accord with the vehicle engine capacity as well as vehicle tailpipe diameter, will not be accepted. The purpose of this portion of the specification is to ensure that the exhaust system is designed to cool down hot exhaust gases as they are conveyed to the outside of vehicle garage. This type of exhaust extraction keeps exhaust temperatures within a safe limit to keep exhaust system hoses within their designed temperature tolerances. Exhaust systems that size exhaust drops without dilution

ventilation and also down size the exhaust connection hose unnecessarily put vehicle engine warranty at risk.

2.3 STRUCTURAL SUPPORT SYSTEM

- A. The exhaust system must be suspended from the building structure by means of plated or painted steel strut designed to eliminate sway of overall exhaust system. The forces that are calculated must correspond with the release method of the exhaust system. Systems which use a pull back or yanking of exhaust hose will require a higher level of system support structure. Overall look of suspension system must match the station quarters in a way that will benefit the appearance of the facility. Contractor shall coordinate method of supporting the exhaust system with manufacturer's representative which includes maneuvering around bay doors.

2.4 SUCTION RAIL ASSEMBLY

- A. The exhaust system must be equipped with a lightweight suction rail system to convey the exhaust hose from door threshold to vehicle park position. The suction rail must weigh no more than 50 lbs. per 20-foot section. This suction rail must be designed for the specific use of vehicle garage exhaust ventilation and engineered to carry the specific weight of all exhaust system components attached to the suction rail. The pull forces placed upon rail system when vehicle is disconnected from system must be structurally supported to eliminate sway of rail.
- B. Suction rail must be supported a minimum of every 14 ft and no more than 4 ft of rail must be cantilevered from the end of the first and last support. A minimum of 3 supports must be required in case of damage to one of the supports. The end of suction rail must not be mounted over 3-feet from the bay door. The suction rail support must allow for mounting from the top of the rail rather than the side of suction rail for a simple leveling procedure.
- C. The suction rail must be sealed with high temperature rubber seals that incorporate a means of conveying energy to system nozzle. The temperature rating on the rubber seals must be a minimum of 340 degrees and be no more than 1/8" thick. The purpose of the certain thickness of the rubber seal is to keep the seal tight to the exhaust trolley, which keeps air clearance losses at less than 2 %.

2.5 EXTRACTION TROLLEY ASSEMBLY

- A. The design of the exhaust trolley must make the suction rail system have air losses of no more than 2 %. Exhaust trolley must be constructed from cast aluminum to keep the overall trolley weight at a minimum and provides longer life. The length of the trolley must be 28" minimum and incorporate a Teflon edge to make the travel of the trolley as frictionless as possible. The front and back exhaust trolley must have a rubber bumper and receiving plate incorporated into the outer frame of trolley.
- B. The trolley must have a total of eight wheels, four of these wheels run on a vertical edge inside the rail in vertical fashion. The remaining four wheels attach to the system trolley horizontally and keep the trolley from rolling in square fashion to the bay door. The vertically mounted wheels must be made from high resistance urethane and be sized to hold the trolley level inside the rail as it rolls to the door.
- C. Any system that uses the trolley leading edge to disconnect the hose system from the vehicle as it exits the station house must not be accepted.

2.6 BALANCER

- A. The balancer is reducing torque style and uses a total amount of 27 feet of cable. The hose balancer cable must be capable of stretching to a minimum of 4 ft from outside of threshold of bay door for an outside connection to the special purpose vehicle provided that the suction rail system is terminated within 2 feet of exiting door. This system attachment performed outside the station house bay door will ensure that no vehicle exhaust gases will enter the apparatus bay. The outside attachment of exhaust system must be accomplished for several safety reasons:
1. The driver can clearly see the system operator (person who attaches hose system to special purpose vehicle) in side-view mirrors.
 2. The system operator can signal the driver very clearly being outside the door threshold, not hidden behind the bay door divider.
 3. The vehicle can be stopped at the correct attachment point in a much simpler fashion than trying guess when vehicle tailpipe is inside door threshold the correct distance for operator to hook up system.
 4. Avoids guesswork in the connection of the system because driver of vehicle can see if hose is connected to the emergency vehicle.
- B. When balancer and lower hoses are in the full stretched out position the balancer must decrease pull tension. This function normally referred to as reducing torque retraction and is accomplished by means of centrifugal brake and is designed to keep hose from snapping back into station. The balancer cord must extend all the way to connection point of the system to ensure that hoses are not pulled apart upon the release of system. The internal linkage of balancer cord must be shrouded in high temperature plastic material with a temperature rating of 375 degrees to protect cord from abrasive exhaust fumes. The fastening linkage must be corrosion resistant and must be designed for easy disconnection from attachment point.
1. The system balancer must be designed to with the capability of replacing cable without having to change out complete balancer unit

2.7 RAIL SYSTEM END STOP

- A. The suction rail system end stop must be an able to catch and keep the hose assembly at the exiting end of the rail. The catch plate must be designed to hold the entire trolley and hose assembly at the door without rolling back away from the door. This feature enables the reconnection of exhaust hose a easy and simple connection without the need of waling back into the station house.
1. If necessary, the trolley balancer unit must be able to be reeled back to the back door of the station house to make the connection of the hose assembly a simple procedure.

2.8 THE DISCONNECT SWITCH

- A. The trolley must be equipped with a means to automatically disconnect the hose assembly based on the speed of the vehicle in the designated bay.

2.9 VERTICAL HOSE

- A. The system hose is designed withstand temperatures up to 370 degrees intermittent and 340 degrees for operation over 5 minutes. The hose is fabricated using a mechanical clinch and is designed to wear a minimum of 1 year no matter how many runs the vehicle makes in the bay.

- B. The vertical hose must not be used as the structural member of the exhaust system, but rather, hang from the track without having to carry the weight of the entire vertical and lower hose system. This feature ensures that the exhaust hose is not stretched and pulled apart if system doesn't release from vehicle. Vertical hose is designed to stretch outside the bay door for a safe connection to the vehicle outside the station. The hose will also have an external sleeve that holds the stored hose in a safe fashion.
- C. Sealed systems that are engineered with flexible hoses that are laminated and are sized smaller than the vehicle tailpipe must not be accepted. (Exhaust hoses that are laminated neoprene-coated polypropylene fabric with wire helix structure must not be accepted. This type of manufactured exhaust hose is not necessarily designed for certain demands placed on the material and workmanship in the application of special purpose vehicle exhaust ventilation. These hoses are commonly used in this application and have not been able to hold up to their designed integrity for heavy-duty applications like vehicle garage exhaust extraction.)
- D. The manufacturer of the flexible hose must validate the temperature rating of the flexible hose on company letterhead. The performance of the flexible must be documented and supported with full knowledge of the parameters of the application of emergency vehicle exhaust ventilation. Testing must be approved an independent laboratory that has privately tested the flexible hose for high temperature threshold as well low temperature threshold ratings.
- E. The flexible hose must be designed to expand and retract along the track height without any portion of the flexible horizontal hose hanging down more than 12 inches from bottom of track profile. This method of carrying the horizontal hose must incorporate a sliding device that attaches to the top of horizontal hose every 12 inches. Multiple attachments to the horizontal hose must be required to keep all the horizontal hose up and out of the way of station aisle way. No hoses must be acceptable that are glued together neoprene-coated polypropylene fabric with wire helix structure.
- F. The hose must not be used as the support and conveying mechanism in the venting and releasing of exhaust gases as the vehicle accelerates out of the vehicle garage.
- G. The Upper Vertical Suction Hose must be 6" in diameter, and of suitable flexibility to have a compression ratio of 6:1. The hose material must be fabric covered with Chloro-sulfonated polyethylene. The hose must be fire resistant according to DIN 4102 B 1. The hose must be capable of withstanding temperatures of 340 degrees Fahrenheit continuously, up to 370 degrees Fahrenheit on an intermittent usage basis. (NOTE: If a 'closed type sealed system' is being used, the temperature ratings must be 680°F and 740°F respectively.) The helix must be external and made of galvanized steel or aluminum. The helix must have high flexibility and be able to withstand oil, chemical, ozone and weather resistance.

2.10 THE ERGONOMIC HANDLE

- A. The exhaust system must have a handle incorporated into the overall design of the hose system, which has been specifically designed to eliminate bending or stooping over when system is attached to the vehicle. The connection must be so simple that the operator can use the system correctly upon commissioning of system. The system handle must be made from a soft foam material incapable of scrapping the side of special purpose vehicle. Handle must be permanently attached to hose system in such a way so that the connection requires no twisting or turning of operator wrists and arms to make a correct attachment to the vehicle.

- B. The attachment method must be a one-step method. No twisting of forearms and wrists to grab, also no leaning forward pull the system to the door threshold must be accepted. The disconnection of the ergonomic handle from vehicle must be accomplished in an easy fashion by pressing a small toggle by right thumb of operator. A plastic shield to avoid accidental malfunction protects release toggle on handle.

2.11 NOZZLE

- A. The nozzle must have high temperature rubber gasket that attaches to the outer edge of nozzle to protect prevent the nozzle from scrapping the side of the vehicle. The face of the nozzle must incorporate three 10 gage anodized steel bars that act as a combination debris screen and backer surface to hold nozzle against outside edge of exhaust pipe. The purpose of the steel bars is to keep the nozzle from sliding underneath the vehicle and avoids the possibility of getting caught in the vehicle rear wheels.
- B. Exhaust pipe modifications must be accepted, and they must be clearly outlined in the submittal. Department may use several different exhaust pipe modifications so the exhaust system must be flexible in meeting the demands of this requirement.
- C. The nozzle must be a minimum of 8” diameter to enable ambient air to pass through the nozzle as the vehicle is in operation. This nozzle functions as a vent to keep temperatures inside exhaust hose at a minimum. This feature also eliminates the need for explosion proof motors.

2.12 NOZZLE ATTACHMENT AND RELEASE

- A. The exhaust system must be attached to the vehicle before they enter the garage. The system must be designed so that attachment to exhaust hose is accomplished by the operator standing completely erect and with one simple motion connect system to vehicle. The system attachment must be a one step process to the operator and no bending must be required to avoid unnecessary strain on the lower back of operator. At no time must the exhaust nozzle fit underneath the emergency apparatus so to ensure that system nozzle will be free from snagging the underside of vehicle chassis.
- B. The system must not use the pull-off type release but rather a fall-away style of system disconnects. Systems that stretch the exhaust hose to its limit point in order to disconnect the hose from the special purpose vehicle. This type of release will eventually stretch and cause premature fatigue to the flexible hose. The disconnection of the hose is a fall away type release. Any auto-release requiring the exhaust nozzle to sleeve over the tailpipe, which causes the hose itself to pull the system off of the vehicle tailpipe, must not be accepted.
- C. The exhaust system located on the vehicle’s chassis must not be used as the primary pulling support point when vehicle exits the vehicle garage. The purpose of this statement is obvious, the vehicle exhaust pipe is not designed for this type of pulling or tugging action that an exhaust system requires to work over a long period of time.

2.13 THE LOWER HOSE

- A. The exhaust hose must be designed to withstand 400 degrees of continuous operation of engine while inside vehicle garage. The inside of the hose is made of high temperature reflective material and the outside is made from thick abrasion resistant material.

- B. The lower hose must be made of high temperature materials that are designed to eliminate the need of short cycle replacement due to excessive heat or pulsing stresses that occur upon system release. The lower hose must not be a glued hose but rather a stitched hose so that the hose does not pull apart due to excessive heat and pull tension applied to the exhaust system lower hose.

2.14 ANCHOR PLATE

- A. A two-point connection with its primary pulling point at the side of the vehicle. Any system that uses the tailpipe suspension for its primary pulling point must not be accepted.

2.15 THE EXHAUST FAN

- A. Each exhaust fan is designed specifically for each station with several factors being addressed: The size and total number of vehicles being attached to exhaust fan, the constraints of the vehicle garage, the existing electrical phase, and the type of community that the building is located in.
- B. The exhaust fan must be sized for a minimum of 600 CFM per extraction unit unless larger or smaller vehicles are being attached to exhaust system. Total exhaust fan CFM requirement is required and must be validated by certified air balancer because of ambient air induction method of exhaust extraction which creates a longer lasting system. This type of ambient air induction must ensure that the exhaust fan will sense less than 150 degrees at the fan motor, this will ensure the longevity of the exhaust fan motor and bearings.
- C. The standard system uses six-inch diameter (6") exhaust hose we can be assured that larger vehicle will still be within design range for the standard exhaust extraction system. Exhaust fan system must provide negative pressure from the vehicle tailpipe all the way to exhaust fan inlet.
- D. The fan must be spark resistant class A construction, totally enclosed motor.

2.16 DUCTWORK

- A. Exhaust ducting on suction side of fan must be spiral G-90 galvanized pipe and must be a minimum of 14 gage. The seals on the connection must be with 400-degree silicone. Brazing and welding at joints are not required because duct system is designed for 4" of negative pressure and at these pressures the silicone sealant is sufficient to seal the system. The lateral fittings must be brazed or welded and must be designed with a minimum 45-degree branch taps for a smooth convergence of a two or more air streams.
- B. Exhaust ducting on discharge side fan must be sheet steel and must be a minimum of 14 gage. Suitable for welding. The duct system must be suitable for 10" of positive pressure and additional mechanical seals must be required for the sole purpose that ductwork is used as an extension of the exhaust pipe and at times is placed under positive pressure. The lateral fittings must be brazed or welded and must be designed with a minimum 45-degree branch taps for a smooth convergence of a two or more air streams.

2.17 AUTO-START CONTROL SYSTEM

- A. The Electronic control must incorporate a transmitter in the vehicle to ensure that the exhaust fan energizes before vehicle engine starts up. Control unit must be FCC-approved and must not interfere with radio communications in the vehicle garage. The transmitter must be mounted on

the dash in a nonpermanent fashion so that minor changes in orientation can be made without making permanent changes to the vehicle dashboard.

- B. The main purpose of this type of control must be to create a direct link between the engine operation and the exhaust fan operation no matter how long apparatus is running inside vehicle garage. This feature ensures that none of the toxic exhaust gases will leech into station quarters. Pressure start controllers must be accepted provided they do not time out exhaust fan operation while vehicle is in operation inside vehicle garage. Any control method that is initiated by the door operation must not be accepted because door operation is not directly linked to the engine operation inside the vehicle garage

2.18 STACK HEAD

- A. The exhaust discharge stack head will be a no loss type as recommended by American Conference of Governmental Industrial Hygienists (ACGIH) or as otherwise specified. The stack head design will protect against weather elements or introduction of debris.

2.19 DUCT TEST HOLES

- A. Test holes with covers must be provided where indicated or directed, in the duct and plenum to insert Pitot tubes to take air measurements for balancing the air moving system.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXHAUST SYSTEM

- A. The exhaust removal system must be installed as indicated and recommended by the manufacturer. Welding and brazing must conform to ASME-17. Slip joints must be sealed. Riser duct must be supported to the structure as indicated on the drawings. Main duct must be attached to building structural members.

3.3 AIR TESTING OF EXHAUST SYSTEM

- A. The overall design must include individual systems for each apparatus that are specifically designed for the output CFM of the apparatus engine. The design CFM for each vehicle unless otherwise specified must be a minimum of 600 CFM. The designed CFM stated has been selected to ensure that exhaust system will not restrict airflow of exhaust gases as they are ducted to the outside of the station. Testing will be accomplished two ways:
 1. At conclusion of installation of exhaust system all vehicles in facility will be operated for a period of 15 minutes to ensure that extraction hose, ducting, and fan have been sufficiently sized for all the vehicles operating in vehicle garage.
 2. Air balancing must be performed to ensure that the designed CFM requirements are met for each bay.

3.4 BUILDING SURFACE PENETRATIONS

- A. All penetrations must be sealed. Sleeves or framed openings must be utilized where duct penetrates building surfaces. The space between the sleeve or framed opening and the duct must be packed with mineral wool or approved material. Closure collars must be installed around the duct on both sides of the penetrated surface. Collars must fit tight against the building surfaces and snug around the duct.

3.5 GUIDE TRACK

- A. Installation height of Guide Track must be between 10' to 16' range or as otherwise indicated on the drawings. The Guide Track must be installed approximately 14" from the side of the vehicle and ~ 12" away from the side edge of the exit door. The Guide Track for the exhaust system must include corrosion resistant brackets for ease of mounting to structural channel, trusses, or angle iron. Brackets must be a minimum of 0.125" thickness. Mounting bolts to be no less than 0.375" diameter (structural grade 8) for connection to steel frame. Bolts required for masonry installation must be 0.5" x 3.5" expansion bolts, or 0.375" x 4" sleeve anchors for wall mount masonry connection.
- B. Recommendation: Unistrut 1 5/8", or Angle Iron 2"x2"x3/8" or 2"x2"x5/16" tube.

3.6 TESTS

- A. Each exhaust system and inlet must be balanced to produce the indicated air quantities within 10 percent at the conditions shown. Any fans with bearings must be lubricated, and the speed, direction and rotation of each fan must be checked and verified as running correctly. The running current of each motor must be checked and verified as correct. Upon completion and prior acceptance of the installation, the exhaust system must be tested at the operating conditions to demonstrate satisfactory functional and operating efficiency. The Contractor must provide all instruments, facilities, and labor required to properly conduct the tests.

3.7 INSTRUCTION

- A. Factory trained authorized approved personnel, must provide instruction to City of New York staff maintenance personnel in the daily use of and maintenance of the vehicle exhaust removal system installed and specified herein.
- B. Provide instruction video for reference and future use.

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SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Ceiling Diffusers
 - 2. Supply Grilles
 - 3. Return/Exhaust Grilles
 - 4. Spiral Duct Grilles
- B. Related Sections:
 - 1. Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: For each type of product indicated, include the following:
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static pressure drop, and noise ratings.
 - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

PART 2 - PRODUCTS

2.1 CEILING DIFFUSER (CG-1)

- A. Manufacturers:
 - 1. Titus
 - 2. Price Industries
 - 3. Anemostat



4. Or Approved Equal

- B. Architectural round panel ceiling diffusers must be the steel diffuser of the sizes and mounting types shown on the plans and outlet schedule. The diffuser must have a 22-gauge steel face panel that captures a secondary 22-gauge panel. The face panel is removable by means of four hanger brackets. The exposed surface of the face panel must be smooth, flat, and free of visible fasteners.
- C. The face panel must project ¼ inch below the outside border of the diffuser backpan. Panels projecting more than ¼ inch below the outside border are not acceptable. The back of the face panel must have an aerodynamically shaped, rolled edge to ensure a tight horizontal discharge pattern. A single metal thickness on the edges of the face panel will not be accepted. Ceiling diffusers with a 24 x 24-inch full face must have no less than an 18 x 18-inch face panel size. Ceiling diffusers with a 12 x 12-inch full face must have no less than a 9 x 9-inch face panel size.
- D. The back pan must be one piece precision die-stamped and must include an integrally drawn inlet (welded-in inlets and corner joints are not acceptable). The diffuser back pan must be constructed of 22-gauge steel. The diffuser neck must have a minimum of 1¼-inch depth available for duct connection.
- E. The finish must be #26 white. The finish must be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H.
- F. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
- G. Round damper must be constructed of heavy gauge steel. Damper must be operable from the face of the diffuser. Optional Directional Blow clips must be available to restrict the discharge air in certain directions.
- H. The manufacturer must provide published performance data for the square panel diffuser. The diffuser must be tested in accordance with ANSI/ASHRAE Standard 70-1991.

2.2 SUPPLY/RETURN/EXHAUST GRILLE (SG-1,2, RG-1, EG-1)

- A. Manufacturers:
 - 1. Titus
 - 2. Price Industries
 - 3. Anemostat
 - 4. Or Approved Equal
- B. Steel grilles must be (double deflection) of the sizes and mounting types shown on the plans and outlet schedule. The deflection blades must be available parallel to the short dimension of the grille. Construction must be of steel with a 1¼-inch wide border on all sides. Screw holes must be countersunk for a neat appearance. Corners must be welded with full penetration resistance welds.



- C. Deflection blades must be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades must be spaced on $\frac{3}{4}$ -inch centers. Blades must have steel friction pivots on both ends to allow individual blade adjustment without loosening or rattling. Plastic blade pivots are not acceptable.
- D. Optional opposed-blade volume damper must be constructed of heavy gauge steel. Damper must be operable from the face of the grille.
- E. The grille finish must be #26 white. The finish must be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
- F. The manufacturer must provide published performance data for the grille. The grille must be tested in accordance with ANSI/ASHRAE Standard 70-1991.

2.3 SPIRAL DUCT GRILLE (SDG-1)

- A. Manufacturers:
 - 1. Titus
 - 2. Price Industries
 - 3. Anemostat
 - 4. Or Approved Equal
- B. Aluminum supply grilles must be direct spiral duct-mounted supply grilles model double deflection or perforated face for the sizes and mounting types as shown on the plans and outlet schedule. The deflection blades must be available parallel to the long or short dimension of the grille. All supply grilles must be constructed with radius end caps and foam gaskets for a tight seal to the duct diameter. All supply grilles must be constructed with a 1 $\frac{3}{8}$ -inch wide border.
- C. Blades must be constructed of heavy duty extruded aluminum and must be spaced $\frac{3}{4}$ -inch apart. Blades must extend completely through the side frame on each side to ensure stability throughout the complete cfm operating range of the grille. Blades must be individually adjustable without loosening or rattling and must be securely held in place with tension wire.
- D. Air scoop damper/extractor (option ASD) must be constructed of heavy duty aluminum. The ASD must be operable from the face with a screwdriver.
- E. The grille finish must be #26 white. The finish must be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
- F. The manufacturer must provide published performance data for the grille. The grille must be tested in accordance with ANSI/ASHRAE Standard 70-1991.



PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Commissioner for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13

SECTION 23 72 00

AIR -TO-AIR ENERGY RECOVERY EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Energy Recovery Ventilator (ERV) must be a packaged unit and must transfer both sensible and latent energy using static plate core technology.

1.3 RELATED SECTIONS

- A. Section 230153 – Common Motor Requirements for HVAC
- B. Section 230548 –Vibration and Seismic Control for HVAC
- C. Section 230700 – HVAC Insulation
- D. Section 233113 – Metal Ducts
- E. Section 230593 – Testing, Adjusting and Balancing for HVAC

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Shop Drawings:
1. Mfg. And Model No.
 2. Accessories Provided
 3. Dimensioned Drawing
 4. Motor Data
 5. CFM, total static pressure, ext. static pressure
 6. Energy wheel performance data for summer and winter design efficiency, exhaust air transfer ratio.
 7. Fan Classification Curves, Operating Data
 8. Wiring Diagrams
 9. Estimated gross weight of each installed unit.
- C. Operating Instructions:



1. All information provided under shop drawings plus following:
 - a. Installation Instructions
 - b. Operating and Maintenance Instructions
 - c. Recommended Spare Parts
 - d. Dimensional Drawing

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Manufacturer must be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test must be UL Standard 723.
- C. All wiring must be in accordance with the National Electric Code (NEC).
- D. The energy recovery cores used in these products must be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications must confirm manufacturer’s published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and exhaust air leakage (EATR). Products that are not currently AHRI Certified will not be accepted.
- E. Unit must be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. Some exceptions to UL Listing may apply.
- F. System efficiency must meet or exceed 65% thermal efficiency and 40% enthalpy recovery efficiency.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Unit must be stored and handled according to the manufacturer’s recommendations.

1.7 LIMITED WARRANTY

- A. Manufacturer must warrant the product to free from defects in material or workmanship. This warranty applies to parts only for one (1) year from substantial completion.

1.8 EXTENDED WARRANTY

- A. Six-year extended warranty for heat exchanger core and two- year for compressor and compressor parts only from the date substantial completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Greenheck Fan Corporation
- B. RenewAire
- C. Mitsubishi
- D. Approved Equal

2.2 PRODUCT DESCRIPTION

- A. Performance
 - 1. The energy recovery ventilator unit must meet the performance parameters as indicated on the mechanical equipment schedule sheet.
- B. Operating Range
 - 1. The equipment operating range must be 5°F DB ~ 122°F DB and 80%RH or less. The ERV core must perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions must not affect the usual function, performance or durability of the core. No condensate drains will be allowed.
 - 2. Unit must have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.
- C. Cabinet
 - 1. Materials: Formed single wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
 - a. Outside casing: 18 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish.
 - b. Internal assemblies: 18 gauge, galvanized (G90) steel except for motor supports which must be minimum 14 gauge galvanized (G90) steel.
 - 2. Access doors must be hinged.
 - 3. Must have factory-installed duct flanges on all duct openings.
 - 4. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
 - a. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
 - 1) Thickness: 1 inch (25 mm)
 - 2) Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
 - 3) Location and application: Full coverage of entire cabinet exterior to include walls, roof and floor of unit. Insulation must be of semi-rigid type and installed between inner and outer shells of all cabinet exterior components.



D. Energy Wheel

1. Energy wheel must be of total enthalpy, rotary air-to-air type and must be an element of a removable energy wheel cassette. The cassette must consist of a galvanized steel framework (designed to produce laminar air flow through the wheel), an energy wheel as specified and a motor and drive assembly. The cassette must incorporate a pre-tensioned urethane drive belt with a five year warranty. The wheel media must be a polymer film matrix in a stainless steel framework and be comprised of individual segments that are removable for servicing. Non-segmented energy wheels are not acceptable. Silica gel desiccant must be permanently bonded to the polymer film and must be designed and constructed to permit cleaning and servicing. The energy wheel is to have a five year warranty. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.
2. Supply and Exhaust Air blower Assemblies: Blower assemblies consist of an electric motor and a belt driven blower. Assembly must be mounted on heavy gauge galvanized rails and further mounted on 1.125 inch thick neoprene vibration isolators.
3. Control panel / connections: Energy Recovery Ventilator must have an electrical control center where all high and low voltage connections are made. Control center must be constructed to permit single-point high voltage power supply connections.
4. Frost control: Timed exhaust.
5. Timed exhaust must be provided for frost control of the energy wheel. Control system must include an outdoor air thermostat and pressure sensor on the wheel assembly to initiate frost control sequence.
6. Motorized Dampers: Provide exhaust air and intake Air motorized dampers of low leakage type.

E. Blower

1. Blower section construction, Supply Air and Exhaust Air: Direct drive motor and blower.
2. Blower assemblies: Must be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.
3. Centrifugal blower housing: Formed and reinforced steel panels to make curved scroll housing with shaped cutoff.
4. Forward curved blower (fan) wheels: Galvanized or aluminum construction with inlet flange and mustow blades curved forward in direction of airflow. Mechanically attached to shaft with set screws.
5. Blower performance must be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating".

F. Motors

1. General: Blower motors greater than 3/4 horsepower must be "NEMA Premium" unless otherwise indicated. Minimum compliance with EPart minimum energy-efficiency standards for single speed ODP and TEFC enclosures is not acceptable. Motors must be heavy-duty, permanently lubricated type to match the fan load and furnished at the



specified voltage, phase and enclosure. Drives must be sized for a minimum of 150% of driven horsepower and pulleys must be fully machined cast-type, keyed and fully secured to the fan wheel and motor shafts. Electric motors of ten horsepower or less must be supplied with an adjustable drive pulley. Comply with requirements in Division 23 05 13, matched with fan load.

2. Fan motors must be 60 cycle, 1 phase 208 volts.

G. Filters

1. Unit must have permanent metal filters located in the outdoor air intake and must be accessible from the exterior of the unit. MERV 13 disposable pleated filters must be provided in the intake air stream and MERV 8 filters in the exhaust air stream.

H. Control:

1. The unit must be constructed so that it can be controlled by a factory-supplied microprocessor-based controller or it can be monitored and controlled by a Building Management System (BMS).
2. The unit must be capable of the following modes of operation:
 - a. Energy recovery
 - b. Auto Mode – The unit must be capable of automatically determining the need for performing energy recovery based on the current fan coil operation mode and the current indoor and outdoor temperatures.
3. The following points must be at a minimum available for monitoring at the BMS
 - a. Outside temperature
 - b. Outside relative humidity
 - c. Supply temperature
 - d. Exhaust temperature
 - e. Supply duct static pressure
 - f. Wheel pressure drop
 - g. Filter pressure drop
 - h. Intake Air damper status
 - i. Exhaust Air Damper status
 - j. Supply fan status
 - k. Exhaust fan Status
 - l. Space CO2
 - m. Alarms
4. The following points must be at a minimum available for setpoint adjustment and control via BMS
 - a. Scheduling
 - b. Supply fan speed
 - c. Exhaust fan speed
 - d. Economizer setpoint
 - e. Space CO2 setpoint
 - f. Filter Change setpoints

- I. Options
 1. Provide unit and duct connection orientation as indicated on plans.
 2. Provide motor horsepower as specified in project schedule.
 3. Provide factory installed un-fused, NEMA-1 for indoor and NEA 3R for outdoor rated combination magnetic starter disconnect.
 4. Provide factory installed filter monitors for each airstream.
 5. Provide MERV-13 filters for final installation after construction phase.
 6. Provide ECM controlled motors allowing either two preset speeds or variable speed operation with a 0-10 volt DC control signal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 UNIT LOCATION AND PLACEMENT

- A. Locate and orient unit to provide the shortest and most straight duct connections as noted on plans. Provide service clearances as indicated on the plans.
- B. Use proper rigging, including spreader bars, for safe lifting and placement.
- C. Provide flexible duct connections at unit duct flanges.
- D. Provide spring and neoprene type isolators appropriately sized for unit weight.

3.3 DUCT DESIGN

- A. All ductwork must be designed, constructed, supported and sealed in accordance with SMACNA HVAC Duct Construction Standards and pressure classifications.
- B. Both the return and the supply ducts must be thermally insulated indicated on plans and at minimum in compliance with NYCECC. A continuous vapor barrier must also be provided on surface of the insulation.

3.4 TEST AND BALANCING

- A. Test and Balancing may not begin until 100% of the installation is complete and fully functional.
- B. Follow National Comfort Institute (NCI) air test and balance procedures specific to Heat Recovery Ventilator Balancing Procedure including standard reports to the Commissioner.

3.5 INSTALLATION

- A. Do not operate fans for any purpose until ductwork is clean, filters are in place and fan has been test run under observation.

3.6 STARTUP SERVICE

- A. Factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to Commissioner in writing. Inspection must include a complete startup checklist to include (as a minimum) completed Start-Up Checklists as found in manufacturer's IOM.
- B. Factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, and install clean filters. Measure and record electrical values for voltage and amperage.

3.7 DEMONSTRATION AND INSTRUCTION

- A. Engage a factory authorized service representative to instruct City of New York's maintenance personnel to adjust, operate and maintain the entire unit. Refer to DDC General Conditions for closeout procedures and demonstration and instructions.

END OF SECTION 23 72 00

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SECTION 23 81 29

VARIABLE REFRIGERANT FLOW HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Variable capacity, multi-split heat pump system

1.3 SYSTEM DESCRIPTION

- A. The variable capacity, heat pump air conditioning system must be a Variable Refrigerant Volume Series (heat or cool model) split system as specified. The system must consist of multiple evaporators, manufacturer's specialty Y – piping joints and headers, a two-pipe refrigeration distribution system using PID control and VRV condensing unit. The condenser must be a direct expansion (DX), air-cooled heat pump, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant. The condensing unit may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. All zones are each capable of operating separately with individual temperature control.
- B. The condensing unit must be interconnected to indoor unit models must range in capacity from 7,500 Btu/h to 96,000 Btu/h in accordance with manufacturer's engineering data book detailing each available indoor unit. The indoor units must be connected to the condensing unit utilizing manufacturer's specialty Y – piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable.
- C. Operation of the system must permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with each branch of the cool/heat selector box. Each indoor unit or group of indoor units must be able to provide set temperature independently via a local remote controller

1.4 VRV FEATURES

- A. Voltage Platform – Heat pump condensing units must be available with a 208-230V/3/60 power supply.
- B. Advanced Zoning – A single system will be capable to provide for up to 62 zones.
- C. Auto Charging – Each system must have a refrigerant auto-charging function.
- D. Oil Return Heating – Each system must maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation must not be permitted due to the potential reduction in space temperature.



- E. Independent Control – Each indoor unit must use a dedicated electronic expansion valve for independent control.
 - F. VFD Inverter Control – Each condensing unit must use a high efficiency, variable speed “inverter” compressor coupled with inverter fan motors for superior part load performance.
 - G. Compressor capacity must be modulated automatically to maintain constant suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads.
 - H. Indoor units must use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.
 - I. Flexible Design –
 - 1. Systems must be capable of up to 540ft (640ft equivalent) of linear piping between the condensing unit and furthest located indoor unit.
 - 2. Systems must be capable of up to 3,280ft total “one-way” piping in the piping network.
 - 3. Systems must have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.
 - 4. Systems must be capable of up to 295ft from the first manufacturer’s specialty fitting / branch point.
 - 5. The condensing unit must have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit capacity.
 - 6. Systems must be capable of 49 feet between indoor units.
 - 7. Condensing units must be supported with a fan motor ESP up to 0.32” WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.
 - J. Simple Wiring – Systems may use 16/18 AWG, 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.
 - K. Energy Efficiency – System must have equivalent or better performance than high efficiency air cooled or water cooled chiller systems.
 - L. Outside Air – Systems must provide outside air capability.
 - M. Advanced Diagnostics – Systems must include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.
 - N. Each condensing unit must incorporate contacts for electrical demand shedding.
 - O. Advanced Controls – Each system must have at least one remote controller capable of controlling up to 16 indoor units.
 - P. Each system must be capable of integrating with open protocol BACnet building management systems.
- 1.5 SUBMITTALS
- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”



- B. The equipment supplier must submit as part of the equipment data package condensing unit data sheets. Data sheets to include the following:
1. Capacities at project design conditions: Cooling (Btu/h)
 2. Cooling Input Power – ducted, ductless and mixed (kW)
 3. Part Load IEER – ducted, ductless and mixed
 4. Full Load EER – ducted, ductless and mixed
 5. Capacities at project design conditions: Heating (Btu/h)
 6. Heating Input Power – ducted, ductless and mixed (kW)
 7. Full Load COP@47F – ducted, ductless and mixed
 8. Full Load COP@17F – ducted, ductless and mixed
- C. The submitted capacity and efficiency performance must meet or exceed the listed performance on the schedule at the designed space conditions including de-rate factors for defrost if applicable and refrigerant piping losses.
1. Operating Temperature Range:
 - a. Cooling
 - b. Heating
 2. Power Supply:
 - a. Maximum Circuit Amps (MCA)
 - b. Maximum Overcurrent Protection Amps (MOP)
 - c. Maximum Starting Current (MSC)
 - d. Condenser Fan Motor
 3. Refrigerant:
 - a. Refrigerant Type/Charge
 - b. Control
 4. Unit Data:
 - a. Max. Number of Indoor Units
 - b. Octave Band Sound Power Level. (dBA)
 - c. Weight (lbs)
 - d. Dimensions
- D. The equipment supplier must submit, indoor unit data sheets. Data sheets to include the following:
1. Capacities:
 - a. Cooling (Btu/h)
 - b. Heating (Btu/h)
 2. Air Flow (CFM)
 3. External Static Pressure (ESP)
 4. Octave Band Sound Power Data
 5. Electrical Data (MCA, MOP, MSC)
 6. Weight (lbs):
 7. Dimensions:
- E. The equipment supplier must guarantee the performance of their system and all published data submitted. Performance must be based on the design criteria below.



1. Room Temperature (Cooling): 72°F
2. Room Temperature (Heating): 75°F
3. Ambient Temperature (Summer): 92°F DB / 74°F WB
4. Ambient Temperature (Winter): 5°F

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. The units must be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
- C. All wiring must be in accordance with the National Electric Code (NEC).
- D. Mechanical equipment for wind-born debris regions must be designed in accordance with ASCE 7-2010 and installed to resist the wind pressures on the equipment and the supports.
- E. The condensing unit will be factory charged with R410A.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Unit must be stored and handled according to the manufacturer’s recommendations.

1.8 LIMITED WARRANTY

- A. The manufacturer warrants to City of New York the AC products specified above that under normal use and maintenance for comfort cooling and conditioning applications such products will be free from defects in material or workmanship. This warranty applies to parts only and is 18 months from date of substantial completion.

1.9 EXTENDED WARRANTY

- A. For its compressors only, manufacturer must provide the above warranty (which is applicable to parts only) for a six (6) year period. This extended warranty for compressors is limited in duration to six (6) years date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER’S:

- A. Basis of Design Product: Subject to compliance with requirements, provide products by Daikin or comparable product by one of the following:
 1. Mitsubishi Electric
 2. LG Air Conditioning Technologies
 3. Or Approved Equal

2.2 PERFORMANCE

- A. Performance Conditions:
 1. Cooling: indoor temp. of 80°F DB, 67°F WB and outdoor temp. of 95°F DB.
 2. Heating: indoor temp. of 70°F DB and outdoor temp. of 47°F DB, 43°F WB.
 3. Equivalent piping length: 25ft



4. The system IEER, EER and COP values for systems sized 300MBH and smaller are certified to AHRI Std. 1230.

B. Operating Range:

1. The operating range in cooling will be 23°F DB ~ 122°F DB.
2. The operating range in heating will be 0°F DB – 77°F DB / -4°F WB – 60°F WB.
3. Cooling mode indoor room temperature range will be 57°F-77°F WB.
4. Heating mode indoor room temperature range will be 59°F-80°F DB.

2.3 REFRIGERANT PIPING

- A. The system must be capable of refrigerant piping up to 540 actual feet or 620 equivalent feet from the condensing unit to the furthest indoor unit, a total combined liquid line length of 3,280 feet of piping between the condensing and indoor units with 295 feet maximum vertical difference, without any oil traps.
- B. Specialty fittings and piping joints and headers must be used to ensure proper refrigerant balance and flow for optimum system capacity and performance. T style joints must not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.

2.4 CONDENSING UNIT

- A. General: The condensing unit is designed specifically for use with VRV components.
 1. The condensing unit must be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit must consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator.
 2. Liquid and suction lines must be individually insulated between the condensing and indoor units.
 3. The condensing unit can be wired and piped with access from the left, right, rear or bottom.
 4. The connection ratio of indoor units to condensing unit must be permitted up to 200%.
 5. Each condensing system must be able to support the connection of up to 59 indoor units dependent on the model of the condensing unit.
 6. The sound pressure level standard must be that value as listed in the engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit must be capable of operating automatically at further reduced noise during night time.
 7. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
 8. The unit must incorporate an auto-charging feature.
 9. The condensing unit must be modular in design and should allow for side-by-side installation with minimum spacing.
 10. The following safety devices must be included on the condensing unit; high pressure sensor and switch, low pressure switch, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
 11. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit must be provided with a sub-cooling feature.
 12. Oil recovery cycle must be automatic occurring 2 hours after start of operation and then every 8 hours of operation. Each system must maintain continuous heating during oil



- return operation. Reverse cycle (cooling mode) oil return during heating operation must not be permitted due to the potential reduction in space temperature.
13. The condensing unit must be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls or an auxiliary heat source.
- B. Unit Cabinet:
1. The condensing unit must be completely weatherproof and corrosion resistant. The unit must be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
- C. Fan:
1. The condensing unit must consist of one or more propeller type, direct-drive 350 or 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.
 2. The condensing unit fan motor must have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and must be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.
 3. The fan must be a vertical discharge configuration with a nominal airflow maximum range of 6,350 CFM to 24,690 CFM dependent on model specified.
 4. Nominal sound pressure levels must not exceed 60 dBA at 3.3 feet from the unit.
 5. The fan motor must have inherent protection and permanently lubricated bearings and be mounted.
 6. The fan motor must be provided with a fan guard to prevent contact with moving parts.
 7. Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed must be a standard feature. Operation sound level must be selectable from 3 steps of sound pressure levels at 55 dBA, 50 dBA and 45 dBA.
- D. Condenser Coil:
1. The condenser coil must be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The heat exchanger coil must be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
 3. The heat exchanger on the condensing units must be manufactured from seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
 4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.
 5. The pipe plates must be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.
- E. Compressor:
1. The inverter scroll compressors must be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures must be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) must be controlled to eliminate deviation from target value.



2. The inverter driven compressor in each condensing unit must be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G2-type” with a maximum speed of 7,980 rpm.
3. Neodymium magnets must be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range must be as low as 4% to 100%.
5. Each non-inverter compressor must also be of the hermetically sealed scroll type.
6. Each compressor must be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators must be standard with the equipment together with an intelligent oil management system.
8. The compressor must be spring mounted to avoid the transmission of vibration.
9. Unit’s sized 6 tons must contain a minimum of 1 inverter compressor. 8-12 ton units must contain a minimum of 1 inverter and 1 fixed compressors. In the event of compressor failure the remaining compressors must continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls must be designed to specifically address this condition.
10. In the case of multiple condenser modules, conjoined operation hours of the compressors must be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

F. Electrical:

1. The power supply to the condensing unit must be 208-230 volts, operating voltage range of 187V~253 V, 3 phase, 60 hertz +/- 10%.
2. The control voltage between the indoor and condensing unit must be 16VDC non-shielded, stranded 2 conductor cable.
3. The control wiring must be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one condensing unit with one 2-cable wire, thus simplifying the wiring installation.
4. The control wiring lengths must be as shown below.

	Condenser to Indoor Unit	Condenser to Central Controller	Indoor Unit to Remote Control
Control Wiring Length	6,665 ft	3,330 ft	1,665 ft
Wire Type	16/18 AWG, 2 wire, non-polarity, non-shielded, stranded		

2.5 BRANCH SELECTOR BOX

A. General:

1. The selector boxes must be factory assembled, wired, and piped.
2. The branch controllers must be run tested at the factory.
3. The selector boxes must be mounted indoors.
4. When simultaneously heating and cooling, the units in heating mode must energize their subcooling electronic expansion valve.



- B. Unit Cabinet:
 - 1. The units must have a galvanized steel plate casing.
 - 2. Each cabinet must house 3 electronic expansion valves for refrigerant control per branch.
 - 3. The cabinet must contain one subcooling heat exchanger per branch.
 - 4. The unit must have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.

- C. Refrigerant Valves:
 - 1. The unit must be furnished with 3 electronic expansion valves per branch to control the direction of refrigerant flow. The use of solenoid valves for changeover and pressure equalization must not be acceptable due to refrigerant noise.
 - 2. The refrigerant connections must be of the braze type.
 - 3. In multi-port units, each port must have its own electronic expansion valves. If common expansion/solenoid valves are used, redundancy must be provided.
 - 4. Each circuit must have at least one branch selector box.
 - 5. Multiple indoor units may be connected to a branch selector box with the use of a splitter joint provided they are within the capacity range of the branch selector.

- D. Condensate Removal:
 - 1. The unit must not require provisions for condensate removal. A safety device or secondary drain pan must be installed by the mechanical contractor to comply with the applicable mechanical code, if an alternate manufacturer is selected.

- E. Electrical:
 - 1. The unit electrical power must be 208/230 volts, 1 phase, 60 hertz.
 - 2. The unit must be capable of operation within the limits of 187 volts to 255 volts.
 - 3. The minimum circuit amps (MCA) must be 0.1 and the maximum overcurrent protection amps (MOP) must be 15.
 - 4. The control voltage between the indoor and condensing unit must be 16VDC non-shielded 2 conductor cable.

2.6 CONCEALED CEILING DUCTED UNIT

- A. General: indoor unit must be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It must be available in capacities from 7,000 Btu/h to 96,000 Btu/h. to be connected to outdoor unit heat recovery model. It must be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control must be used to control superheat to deliver a comfortable room temperature condition. The unit must be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with remote control. The indoor units sound pressure must be 48 dB(A) at low speed measured 5 feet below the ducted unit.

- B. Performance: Each unit's performance is based on nominal operating conditions as scheduled on plans

- C. Indoor Unit:
 - 1. The indoor unit must be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan



- motor thermal protector, flare connections, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit must have an adjustable external static pressure switch.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines must be insulated from the outdoor unit.
 4. The indoor units must be equipped with a return air thermistor.
 5. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 6. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. Unit Cabinet:
1. The cabinet must be located into the ceiling and ducted to the supply and return openings.
 2. The cabinet must be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- E. Fan:
1. The fan must be direct-drive Sirocco type fan, statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor must operate on 208/230 volts, 1 phase, 60 hertz, with a motor output of 0.51 HP.
 3. The airflow rate must be available in high and low settings.
 4. The fan motor must be thermally protected.
 5. The fan motor must be equipped as standard with adjustable external static pressure (ESP) settings.
 6. Fan motor external static pressure for nominal airflow as scheduled on plans:
- F. Coil:
1. Coils must be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil must be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coil must be a 3 row cross fin copper evaporator coil with 13 fpi design completely factory tested.
 4. The refrigerant connections must be flare connections and the condensate will be 1-5/16 inch outside diameter PVC.
 5. A thermistor will be located on the liquid and gas line.
- G. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range must be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit must be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller must be a maximum distance of 1,640 feet.
- H. Control:
1. The unit must have controls provided by to perform input functions necessary to operate the system.
 2. The unit must be compatible with interfacing with a BMS system via optional BACnet gateways.
 3. Provide low profile thermistor button sensor to connect to indoor AC unit local controller. Refer to paragraph 2.10 of this specification.



4. The unit must be compatible with a intelligent Touch advanced multi-zone controller. Consult with manufacturer's representative prior to applying controls.
- I. Accessories must include:
 1. A high efficiency disposable MERV 13 air filter kit including filters
 2. One set of spare filters
- 2.7 WALL MOUNTED UNIT
- A. General: Indoor unit must be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. This compact design with finished white casing must be available in capacities from 7,500 Btu/h to 24,000 Btu/h. Computerized PID control must be used to control superheat to deliver a comfortable room temperature condition. The unit must be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter must be included as standard equipment. The indoor units sound pressure must range from 31 dB(A) to 40 dB(A) at low speed measured at 3.3 feet below and from the unit.
 - B. Indoor Unit:
 1. The indoor unit must be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit must have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller must be able to set five (5) steps of discharge angle. The front grille must be easily removed for washing. The discharge angle must automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines must be insulated from the outdoor unit.
 4. Return air must be through a resin net mold resistant filter.
 5. The indoor units must be equipped with a condensate pan.
 6. The indoor units must be equipped with a return air thermistor.
 7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 8. The voltage range will be 253 volts maximum and 187 volts minimum.
 - C. Unit Cabinet:
 1. The cabinet must be affixed to a factory supplied wall mounting template and located in the conditioned space.
 2. The cabinet must be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
 - D. Fan:
 1. The fan must be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor must operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.
 3. The airflow rate must be available in high and low settings.
 4. The fan motor must be thermally protected.
 - E. Coil:



1. Coils must be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil must be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coil must be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.
 4. The refrigerant connections must be flare connections and the condensate will be 11/16 inch outside diameter PVC.
 5. A thermistor will be located on the liquid and gas line.
 6. A condensate pan must be located in the unit.
- F. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range must be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit must be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller must be a maximum distance of 1,640 feet.
- G. Control:
1. The unit must have controls provided by manufacturer to perform input functions necessary to operate the system.
 2. The unit must be compatible with interfacing with a BMS system via BACnet gateways.
- H. Accessories:
1. Remote sensor kit.
 2. In pan condensate pump.

2.8 LOW PROFILE BUTTON SENSOR

- A. Provide low button profile sensor. Small flush sensor mounting for accurate direct air measurement and paintable with Latex or Oil Base.
- B. Sensor Passive
1. Thermistor NTC, 2 wire
- C. Thermistor
- D. Thermal resistor
1. Temp. Output Resistance
 2. Accuracy (Std) $\pm 0.36^{\circ}\text{F}$, ($\pm 0.2^{\circ}\text{C}$)
 3. Accuracy (High) $\pm 0.18^{\circ}\text{F}$, ($\pm 0.1^{\circ}\text{C}$),
 4. Stability $< 0.036^{\circ}\text{F}/\text{Year}$, ($< 0.02^{\circ}\text{C}/\text{Year}$)
 5. Heat dissipation $2.7 \text{ mW}/^{\circ}\text{C}$
 6. Temp. Drift $< 0.02^{\circ}\text{C}$ per year
 7. Probe range -40° to 221°F (-40° to 105°C)
- E. Sensitivity
1. Thermistor Non-linear
 2. RTD (PT) $3.85\Omega/^{\circ}\text{C}$ for $1\text{K}\Omega$ RTD
 3. $3.75\Omega/^{\circ}\text{C}$ for $1\text{K}\Omega$ RTD
 4. $0.385\Omega/^{\circ}\text{C}$ for 100Ω RTD
 5. Nickel (Ni) $2.95\Omega/^{\circ}\text{F}$ for the JCI RTD



- F. Lead wire: 2 or 3 conductor, 22 AWG stranded wire
 - 1. Wire Insulation: Etched Teflon, Plenum rated
 - 2. Wiring: Two 22 AWG wires (non-polar)
 - G. Mounting: 3/8" hole, push in plastic sheath with peel off tape strip.
 - H. Dimensions: Plastic Sheath
 - 1. Insertion 1.0" depth, into a 0.375" hole
 - 2. Sleeve 0.375" Diameter
 - 3. Bezel 0.875" Diameter
 - I. Enclosure Type: Round Flush Sensor Sheath
 - J. Enclosure ratings: NEMA 1
 - K. Encl.Material: White Delrin, UL94V-HB
 - L. Ambient (Encl.)
 - 1. 0 to 100% RH, Non-condensing
 - 2. -40°F to 185°F, (-40° to 85°C)
 - M. Agency
 - 1. RoHS, CE* (Thermistor's <10KΩ)
 - 2. PT= DIN43760, IEC Pub 751-1983,
 - 3. JIS C1604-1989
- 2.9 NAVIGATION REMOTE CONTROLLER
- A. The NAV Remote Controller can provide control for all VRV indoor units. The remote controller wiring consist of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The NAV Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). The NAV Remote Controller does not require addressing.
 - B. Mounting: The NAV Remote Controller must be mounted into a standard 2" x 4" junction box.
 - C. Display Features:
 - 1. The NAV Remote Controller must be approximately 4.75" x 4.75" in size with a backlit 2.75" x 1.75" LCD display.
 - 2. Display information must be selectable from English, French, or Spanish.
 - 3. Feature Backlit LCD Display with contrast adjustment and auto off after 30 seconds.
 - 4. The controller must display Operation Mode, Setpoint, and Fan Speed.
 - 5. System Status icons in large font.
 - a. The controller must display temperature setpoint in one degree increments with a range of 60-90°F (0-32°C)
 - 6. Detailed display will reflect room temperature (0-176oF/-17-80oC range in one degree increment).
 - a. Display of temperature information must be configurable for Fahrenheit or Celsius
 - 7. On/Off status must be displayed with an LED.



8. Error codes will be displayed in the event of system abnormality/error with a two digit code.
 - a. A blinking LED will also signal system abnormality/error
 9. The following system temperatures can be displayed to assist service personnel in troubleshooting:
 - a. Return Air Temperature
 - b. Liquid Line Temperature
 - c. Gas Line Temperature
 - d. Discharge Air Temperature (depending on unit),
 - e. Remote Controller Sensor Temperature
 - f. Temperature used for Indoor Unit Control
- D. Basic Operation:
1. Capable of controlling a group of up to 16 indoor units.
 2. Controller must control the following group operations:
 - a. On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto* (*with VRV Heat Recovery & Heat Pump Systems))
 - b. Independent Cooling and Heating setpoints in the occupied mode
 - c. Independent Cooling Setup and Heating Setback setpoints in the unoccupied mode
 - d. Fan Speed
 - e. Airflow direction (dependent on indoor unit type).
 - f. The controller must be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period
 - g. Lock out key settings
 - h. Indoor unit group assignment
- E. Programmability:
1. Controller must support schedule settings with selectable weekly pattern options.
 - a. 7-day
 - b. Weekday + Weekend
 - c. Weekday + Saturday + Sunday
 - d. The schedule must support unit On/Off
 - e. Independently settable Cooling and/or Heating setpoints when unit is on (occupied)
 - f. Setup (Cooling) and Setback (Heating) setpoints when unit is off (unoccupied)
 - g. A maximum of 5 operations can be schedulable per day
 - h. Time setting in 1-minute increments
 2. The Controller must support auto-changeover mode for both heat pump and heat recovery systems allowing the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat according to the room temperature and temperature setpoint.
 - a. Changeover to cooling mode must occur at cooling setpoint + 1°F (0.5°C)
 - b. Changeover to heating mode must occur at heating setpoint - 1°F (0.5°C)
 3. The Controller must support an Auto Off Timer for temporarily enabling indoor unit operation during the unoccupied period.
 - a. When the Off Timer is enabled and when the unit is manually turned on at the remote controller
 - b. The controller must shut off the unit after a set time period
 - c. The time period must be configurable in the controller menu with a range of 30-180 minutes in 10 minute increments



4. The room temperature must be capable of being sensed at either the NAV Remote Controller, the Indoor Unit return air temperature sensor (default), or Remote Temperature Sensor configured through the NAV Remote Controller field settings.

2.10 INTERFACE FOR USE IN BACNET

- A. The Interface for use in BACnet must provide the ability for a Building Management System (BMS) to control all VRV indoor units. It must be capable of controlling a maximum of 64 indoor unit groups (128 indoor units) connected to a maximum of 10 outdoor units.
- B. The Interface for use in BACnet must support operations superseding that of the centralized controller, local remote controller, system configuration, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring.
- C. The Interface for use in BACnet uses a standard open protocol based on ANSI/ASHREA Standard 135. The BACnet Interface has been certified by the BACnet Testing Laboratories (BTL). The BACnet Interface is compatible with BACnet IP (ISO16484-5).
- D. The interface wiring must consist of a non-polar two-wire connection to the terminals F1F2 (out-out) of the outdoor unit. The Interface for use in BACnet is wall mounted and is used as a translator between the BACnet Building Management System (BMS) and the VRV unit communication bus to maintain the optimal operation of the connected indoor unit(s).
- E. The Interface for use in BACnet can be used in conjunction with the Navigation Remote Controller. The remote controller must require daisy chain wiring for grouping multiple indoor units (up to 16) together. Manual addressing is required of each indoor unit group associated with the Intelligent Touch Controller and the Interfaces for use in BACnet.
- F. The Interface for use in BACnet must be equipped with one RJ-45 Ethernet port to support interconnection with a network PC via the Internet or Local Area Network (LAN). The Ethernet connection must be capable of transmission on 10Base-T and/or 100Base-TX connection at 100 Mbps.
- G. The Interface for use in BACnet must be capable of being configured as a foreign device. It must be capable of communicating across BACnet Broadcast Management Devices (BBMD) in different subnet networks.
- H. The Interface for use in BACnet must be capable of supporting Change of Value (COV) notification for all available objects.
- I. The BACnet Setup Tool must be available so that certified commissioning personnel/facility staff can securely log into each Interface for use in BACnet via a PC to support the configuration and testing of the Interface for use in BACnet.
 1. Mounting: The Interface for use in BACnet must be mounted on the wall or in an enclosure.
 2. Display Features:
 - a. The Interface for use in BACnet must be approximately 10.81" x 10.34" in size.
 - b. LED display provides the interface's operational status and alarm.
 - c. The Interface for use in BACnet must be capable of displaying indoor unit objects on the BACnet building management system.



- d. The Interface for use in BACnet must provide the BACnet building management system the capability to command the setpoint temperature in 1^oF (0.1^oC) increments with a range of 60^oF - 90^oF (16^oC - 32^oC).
 - 1) Display of temperature setpoint information must be configurable for Fahrenheit or Celsius
 - e. The Interface for use in BACnet must provide the BACnet building management system the capability to display the room temperature in 0.1^oF (0.1^oC) increments with a range of -120^oF - 180^oF (-84^oC - 82^oC).
 - 1) Display of room temperature information must be configurable for Fahrenheit or Celsius
 - f. Error codes generated by the indoor units, outdoor units, branch selector boxes, and remote controllers must be displayed on the BACnet building management system in the event of system abnormality/error with a two digit error code.
 - 1) Communication errors between the Interface for use in BACnet and the BACnet building management system must be displayed with a red flashing LED on the Interface for use in BACnet
3. Basic Operation:
- a. The Interface for use in BACnet will provide up to 28 objects that can be monitored/controlled via the BACnet building management system.
 - b. The Building Management System must control the following group operations:
 - 1) On/Off
 - 2) Operation Mode (Cool, Heat, Fan, Auto, and Dry)
 - 3) Single setpoint setting for Cooling and Heating in the occupied mode.
 - 4) Fan status
 - 5) Fan Speed: Up to 3 speeds (dependent upon indoor unit type)
 - 6) Vane direction - 5 fixed positions or swing position (dependent upon indoor unit type)
 - 7) Remote controller permit/prohibit of On/Off, Mode, and Setpoint
 - 8) Filter sign reset for indoor units
 - 9) Disable the Intelligent Touch Controller
 - 10) Forced off of indoor units
 - 11) Forced Thermo-off of indoor units
 - 12) Energy saving offset of indoor unit setpoint
 - 13) Compressor status
 - 14) Thermo-on status
 - 15) Heater status
 - c. Capable of providing battery backup power for up to 3 years in total time for the clock.
 - 1) Settings stored in non-volatile memory
4. Programmability:
- 1) The BACnet building management system must support weekly schedule settings through its programming.
 - 2) The schedule must support the indoor unit:
 - a) On/Off
 - b) Each scheduled event must specify time and target group
 - c) Each scheduled event must include On/Off, Operation Mode, Occupied Cooling Setpoint, Occupied Heating Setpoint, Setup (Cooling) setback setpoint, Setback (Heating) setback setpoint, Remote Controller On/Off Permit/Prohibit, Remote Controller Mode



- Permit/Prohibit, Remote Controller Setpoint Permit/Prohibit, and Timed Override Enable
- d) Setup (Cooling) and Setback (Heating) setpoints when unit is Off (unoccupied) by Group
 - e) An override must be provided for use enabling indoor unit operation during the unoccupied period by the BACnet building management system programming.
- b. The BACnet building management system must support auto-changeover through its programming.
- 1) Auto-change must provide changeover for both Heat Pump and Heat Recovery systems based upon the group configurations. This will allow for the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat in accordance with the room temperature and setpoint temperature.
 - 2) Changeover must change the operation mode of the indoor unit that is set as the Changeover Master. The Changeover Master indoor unit must then change the operation mode of all indoor unit groups daisy chained on the unit communication bus to the same outdoor unit in the Heat Pump system or the same branch selector box in the Heat Recovery system.
 - 3) Changeover to cooling mode must occur when the room temperature is great than or equal to the cooling setpoint
 - a) Differential to be determined by BACnet building management system programming
 - 4) Changeover to heating mode must occur when room temperature is less than or equal to the heating setpoint.
 - a) Differential to be determined by BACnet building management system programming
 - 5) Guard timer
 - a) Upon changeover, guard timer will prevent another changeover during this period.
 - b) Guard timer should be ignored by a change of setpoint manually from the BMS, Intelligent Touch Controller, Remote Controller, or by schedule.
 - c) Guard timer to be configured by BACnet building management system programming (30 minute minimum recommended)
- c. The Interface for use in BACnet must support force shutdown of associated indoor unit groups.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION REQUIREMENTS

- A. The system must be installed by installers instructed by factory technicians. The contractor must submit installer's certification of attending factory instruction classes.
- B. Install indoor evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure. Provide neoprene hanger for isolation. Refer to specification section 230548 "Vibration and Seismic Control for HVAC".



- C. Install outdoor compressor-condenser components on restrained, spring isolators secured to steel dunnage. Refer to specification section 230548 "Vibration and Seismic Control for HVAC".

3.3 CONNECTIONS

- A. Connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.
- B. Connect drain piping and route to nearest indirect drain.

3.4 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. **Leak Test:** After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- C. **Operational Test:** After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components, and retest.
- D. **Test and adjust controls and safeties.** Replace damaged and malfunctioning controls and equipment.

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SECTION 23 82 39

UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Unit Heaters
 - 2. Ceiling Vertical Heater

1.3 QUALITY ASSURANCE

- A. Refer to DDC General Conditions 01 40 00 "Quality Requirements."
- B. Material and installation must comply with the latest edition of application codes, recommended practices, and standards of NEC, NEMA and U.L.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Submittal Data
 - 1. Product Data
 - a. Submit copies of manufacturer's latest published literature for materials specified herein for approval, and obtain approval before materials are delivered to the site.
 - b. Data must include manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gauges and finishes of materials, and installation instructions.
 - 2. Shop Drawings: Shop drawings for work specified herein must be submitted for approval. Shop drawings must show assembly-type drawings showing unit dimensions, construction details, and field connection details.
 - 3. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to terminal units. Submit manufacturer's ladder-type wiring



diagrams for interlock and control wiring. Clearly differentiate between portions of factory-installed and field-installed wiring.

4. Samples: Submit 3 samples for each type of cabinet finish furnished.
5. Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals in accordance with General Conditions requirements as applicable.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and handle as to prevent the inclusion of foreign materials and the damage of breaking, denting and scoring. Do not install damaged terminal units or components; replace with new.
- B. Store materials and equipment where designated. Protect from weather, dirt, fumes, water, construction debris, and physical damage. Contractor must assume responsibility and security for materials and equipment. Take precautions for protection from detrimental conditions.
- C. Comply with Manufacturer's rigging and installation instructions for unloading terminal units, and moving them to final location.

1.7 WARRANTY

- A. Manufacture must warrant the product to free from defects in material or workmanship. This warranty applies to parts only for one year from substantial completion.
- B. The heating elements must be warranted for five years.

PART 2 - PRODUCTS

2.1 UNIT HEATERS

- A. Furnish and install where indicated on plans, electric unit heaters suitable for small and large areas and UL and cUL listed for wall or ceiling mounting.
- B. The cabinet must be made of 18 gauge cold rolled steel, welded, and phosphate coated to resist corrosion. Side, front, and back panels must be removable without dismantling the heater by removing four screws from inside the control compartment, thus permitting full access to the elements and fan motor areas. Individual adjustable louvers with 30 degree downward stops must be furnished to provide desired control of discharge air. The control compartment must be located at the bottom of the cabinet and provided with a swing down hinged cover to permit full access for cleaning and servicing without dismantling the heater. All heater and



control wiring must terminate inside the control compartment. The heater must be provided with combination wall/ceiling bracket for 5.0 KW and 7.5 KW units and must have capability of full horizontal and vertical positions. The cabinet must be finished in a neutral grey epoxy paint.

- C. The heating elements must be of the non-glowing design consisting of 80/20 nickel-chromium resistance wire, embedded in magnesium oxide and enclosed in a metal sheath to which metal plated fins are copper brazed. The elements must be painted with aluminized paint for corrosion resistance and cover the entire discharge area for uniform heating.
- D. The fan motor must be totally enclosed, permanently lubricated, impedance protected, and of unit bearing design suitable for horizontal or vertical operation with high starting and running torques. (5.0 & 7.5 KW units) The fan motor must be totally enclosed, permanently lubricated, thermal protected, and of double bearing design with high starting and running torques. (10 - 30 KW units) The fan blade must be aluminum and directly connected to the fan motor, designed specifically for unit heater application. The fan control must be of the bimetallic snap-action type and must activate fan motor after heating elements reach operating temperature and continue to operate the fan motor after thermostat is satisfied and until the heating elements cool.
- E. A thermal cutout must be built into the system to automatically shut off the heater in the event of overheating and reactivate when temperature returns to normal.
- F. The heater must be provided with a factory installed, heavy duty, 3-pole contactor providing quiet, efficient operation, making external contacts and additional wiring unnecessary.
 - 1. Controls and Accessories:
 - 2. Remote Thermostat Kit
 - 3. Three pole built-in disconnect switch (30 amp rated)
 - 4. Summer/Winter built-in fan switch
 - 5. Combination wall/ceiling bracket
- G. Heaters must be as manufactured by QMark, Berko, Air Therm, or approved equal.

2.2 VERTICAL CEILING HEATERS

- A. Units must be UL listed for safe operation, construction and performance. Units must be listed for commercial and industrial installations.
- B. Heater must be a vertical air delivery electric unit heater of the size, capacity, and voltage as listed in the equipment schedule.
- C. Unit must have a steel casing that is treated for corrosion resistance and painted with an electrostatically applied, baked on, gray-green polyester powdercoat paint finish.



- D. Unit must consist of two circular steel covers bolted together with the heating element supports. The bottom cover must have a die-formed fan venture. The top cover must include an inner cone for motor mounting and to provide a heat shield from radiant and convective heat from the heating elements.
- E. Elements must consist of a nickel-chromium resistance wire surrounded with magnesium oxide and sheathed in steel spiral-finned tubes. Elements must have kilowatt rating as listed in the equipment schedule.
- F. Each unit must have a single 208 V/60hz/1ph motor. The motor must be totally enclosed, continuous-duty, with automatic resetting, thermal-overload protection. Propeller fan must be directly connected to the motor shaft and be statically balanced. The motor must be mounted to the unit with rubber vibration absorbing material.
- G. All units must have built-in contactors and control circuit transformers (where required) to provide single-source power connection.
- H. Fuse blocks and factory-supplied fuses must be installed. A wiring diagram and grounding lug must be included in each control compartment.
- I. Electrical control components must be safely enclosed in a separate junction box. A wiring diagram and a grounding lug must be included in each power junction box.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine conditions at the job site where work of this section is to be performed to ensure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.3 PREPARATION

- A. Examine the Contract Drawings and specifications in order to ensure the completeness of the work required under this Section.
- B. Verify measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

3.4 INSTALLATION



- A. Installation of Electric Heaters
 - 1. Install heaters as indicated, and in accordance with manufacturer's installation instructions.
 - 2. Locate heaters as indicated, coordinate location with Commissioner and with other trades. Ensure that required clearance are maintained to combustible construction.
 - 3. Install wiring as indicated.
- B. Electrical Wiring
 - 1. Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical trade.
 - 2. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections. Do not proceed with equipment startup until wiring installation is acceptable to equipment manufacturer.

3.5 ADJUSTING AND CLEANING

- A. After construction is completed, including painting, clean unit exposed surfaces, vacuum clean coils and inside of cabinets. Retouch any marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

END OF SECTION 23 82 39



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SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Sleeves for raceways and cables.
 2. Sleeve seals.
 3. Grout.
 4. Common electrical installation requirements.
 5. Submittals.
 6. Coordination drawings.
 7. Record documents.
 8. Maintenance manuals.
 9. Rough ins.
 10. Electrical installations.
 11. Cutting and patching.
 12. Codes, Permits and Inspections.
 13. Separation of Work Between Trades.
 14. Definitions and Interpretations.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Product Data: For sleeve seals.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.5 COORDINATION DRAWINGS

- A. Prepare coordination drawings in accordance with DDC General Conditions to a scale of 1/4"=1'-0" (1:50) or larger; detailing major elements, components, and systems of electrical



equipment and materials in relationship with other systems, installations, and building components in spaces such as the main electrical room. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of major raceway systems, equipment, and materials. Include the following:
 - a. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance.
 - b. Exterior wall and foundation penetrations.
 - c. Fire-rated wall and floor penetrations.
 - d. Equipment connections and support details.

B. Project Coordination Drawings

2. This Trade must add to coordination drawings prepared by the other trades showing all of the electrical work (equipment, conduit, etc.) to be installed as part of the work of this section of the specifications; and adjust and resolve any real or apparent interferences or conflicts in coordination with the work of the other trades.

1.6 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in DDC General Conditions. In addition to the requirements specified in DDC General Conditions, comply with the following:
 1. A complete set of "as-built" or record electric drawings is made up and delivered to the Commissioner.
 2. The drawings show:
 - a. All electric work installed exactly in accordance with the original design.
 - b. All electric work installed as a modification or addition to the original design.
 - c. The dimensional information necessary to delineate the exact location of all circuitry and wiring runs (other than lighting and appliance branch circuitry and small control, signal and communications runs) which are so buried or concealed as to be untraceable by inspection through the regular means of access established for inspection and maintenance.
 - d. The numbering information necessary to correlate all electrical energy consuming items (or outlets for same) to the panel circuits from which they are supplied.
 3. The drawings are produced using AutoCAD MEP 2013 software. The design drawing files will be made available should it be determined that such files would serve as suitable backgrounds for the "as-built" drawings. These documents remain the property of Plus Group CE, PLLC and may be used for no other purpose without expressed, written consent. The contractor assumes all liabilities resulting from unauthorized use or modifications to the drawings.
 4. "As-built" information is submitted as follows:
 - a. Bind CAD drawing files on Thumb Disk in AutoCAD MEP 2013 format.
 - b. One (1) set of reproducible drawings.



- c. One set of flattened PDF format
5. The quantity of design drawings which are made available is in no way interpreted as setting a limit to the number of drawings necessary to show the required "as-built" information.
6. Progress prints of record drawings are submitted monthly during the construction period for Commissioner's approval.

1.7 MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with DDC General Conditions. In addition to the requirements specified in DDC General Conditions, include the following information for major equipment items such as alarm system(s), panelboards, lighting fixtures, and other items as specified elsewhere.
 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, restore, and reassembly; aligning and adjusting instructions.
 4. Servicing instructions.

1.8 CODES, PERMITS AND INSPECTIONS

- A. All work meets or exceeds the latest requirements of all latest edition of NYC Electrical Code.
- B. All required permits and inspection certificates are obtained, paid for, and made available at the completion of the work.
- C. Equipment, material, layout and installation provided as part of the electrical work conforms to the requirements of the NYC Advisory Board of the Bureau of Electrical Control (Department of Buildings), the Mechanical Equipment Acceptance Division of the Building Department (MEA), the Board of Standards and Appeals (BSA), and latest edition of NYC Electrical Code. Include as part of the electrical work all required filings and submissions for approval. Equipment furnished separate from - but installed as part of - the electrical work, which does not have all necessary approvals, is not installed until approvals are obtained by the parties furnishing the equipment.
- D. Installation procedures, methods and conditions comply with the latest requirements of the Federal Occupational Safety and Health Administration (OSHA).

1.9 SEPARATION OF WORK BETWEEN TRADES

- A. Include in the electrical work all necessary supervision and the issuing of all coordination information to any other trades who are supplying work to accommodate the electrical installations.



- B. For items of equipment which are installed but not purchased as part of the electrical work, the electrical work includes:
 - 1. The coordination of their delivery.
 - 2. Their unloading from delivery trucks driven in to any point on the property line at grade level.
 - 3. Their safe handling and field storage up to the time of permanent placement in the project.
 - 4. The correction of any damage, defacement or corrosion to which they may have been subjected.
- C. Items of equipment which are installed but not purchased as part of the electrical work are carefully examined upon delivery to the project.

1.10 DEFINITIONS AND INTERPRETATIONS

- A. As used in the drawings and specifications for electrical work, certain non-technical words are understood to have specific meanings as follows:
 - 1. "Circuitry" -- Any electric work (not limited to light and power distribution) which consists of wires, cables, raceways, and/or specialty wiring method assemblies taken all together complete with associated junction boxes, pull boxes, outlet boxes, joints, couplings, splices and connections except where limited to a lesser meaning by specific description.
 - 2. "Wiring" -- Same as Circuitry.
 - 3. "Circuit" -- Any specific run of circuitry.
 - 4. "Branch Circuit" -- Any light and power distribution system circuit which, at its load end, is directly connected to one or more electrical energy consuming items with no overcurrent protection devices interposed, other than (where required) those protecting the energy consuming items from overloading or overheating.
 - 5. "Appliance Panel" -- Any panel, used in a light and power distribution system, containing single pole and/or multipole branches rated in various sizes.
 - 6. "Panelette" -- A panel (Load Center) which meets the specifications for a lighting appliance panel except for smaller maximum permissible dimensions and other minor differences as specified.
 - 7. "Lighting and Appliance Branch Circuitry" -- All or any portion of branch circuits outgoing from a lighting or appliance panel or panelette.
 - 8. "Feeder" -- Any item of light and power circuitry used in a distribution system which is not lighting and appliance branch circuitry.
 - 9. "Main Feeder" -- Any feeder which, at its supply end, is connected through its own overcurrent protection (and switching) device, and none other, directly to a main service or a main service overcurrent protection (and switching) device.
 - 10. "Branch Feeder" -- A feeder, other than a main feeder, which complies with the definition of a branch circuit.
 - 11. "Submain Feeder" -- Any feeder which is neither a main feeder nor a branch feeder.
 - 12. "Distribution Panel" -- Any panel, used in a light and power distribution system, containing only multi-pole branches and with all (or the majority) of its branches used for feeders supplying other panels.



13. "Power Panel" -- Same as distribution panel, except with all (or the majority) of its branches used for feeders which do not supply other panels.
 14. "Motor Power Circuit" -- Any circuit which operates nominally at 100 volts or more, and which carries electrical input energy to a motor.
 15. "Motor Control Circuit" (used in conjunction with a motor for which a magnetic starter is supplied) -- Any circuit (other than a motor power circuit), which operates nominally at 100 volts or more, and which carries current intended for directing or indicating the performance of a motor starter.
 16. "Motor Control Circuit" (used in conjunction with a motor for which a manual starter is supplied) -- Any circuit containing an extension of power circuit wires, other than those constituting the direct connection between source of supply, starter and motor.
 17. "Motor Control Actuating Device" -- Any device which performs a switching function in a motor control circuit (pushbuttons, automatic contacting devices, etc.).
 18. "Motor Control Actuated Device" -- Any device which functions in response to voltage received from a motor control circuit (pilot lights, solenoids, etc.)
 19. "Package Unit" -- An item of equipment having one or more motors or other electric energy consuming elements integrally factory mounted on a single base, complete with all associated control devices and interconnecting wiring.
 20. "Grade Slab" -- A building floor slab which is in contact with or directly over grade (earth).
 21. "Underground" -- Subsurface and exterior to building foundations.
 22. "Standard" (as applied to wiring devices) -- Not of a separately designated individual type.
 23. "Raceway" -- Any pipe, duct, extended enclosure, or conduit (as specified for a particular system) which is used to contain wires, and which is of such nature as to require that the wires be installed by a "pulling in" procedure.
 24. "Concealed" (as applied to circuitry) -- Covered completely by building materials, except for penetrations (by boxes and fittings) to a level flush with the surface as necessitated by functional or specified accessibility requirements.
 25. "Exposed" (as applied to circuitry) -- Not covered in any way by building materials.
 26. "Subject to Mechanical Damage" -- Exposed within seven feet of the floor in mechanical rooms, or other spaces where heavy items (over 100 pounds) are moved around or rigged as a common practice or as required for replacement purposes.
 27. "Primary" (as applied to light and power distribution) -- Under 600 volts.
 28. "Assembly" -- A defined set of elements of electric work.
- B. Where the word "conduit" is used without specific reference to type, it is understood to mean "raceway".
- C. Except where modified by a specific notation to the contrary, it is understood that the indication and/or description of any electrical item in the drawings and specifications for electrical work carries with it the instruction to furnish, install and connect the item as part of the electrical work regardless of whether or not this instruction is explicitly stated.
- D. No exclusion from or limitation in, the symbolism used on the drawings for electrical work or the language used in the specifications for electrical work is interpreted as a reason for omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

- E. The drawings for electrical work utilize symbols and schematic diagrams which have no dimensional significance. The work is, therefore, installed to fulfill the diagrammatic intent expressed on the electrical drawings, but in conformity with the dimensions indicated on the final working drawings, field layouts and shop drawings of all trades.
- F. Certain details appear on the drawings for electrical work which are specific with regard to the dimensioning and positioning of the work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated work.
- G. Information as to general construction and architectural general construction and architectural features and finishes is derived from structural and architectural drawings and specifications only.
- H. Ratings of devices, materials and equipment specified without reference to specific performance criteria are understood to be nominal or nameplate ratings established by means of industry standard procedures.
- I. The restriction of conductors in wires to copper, as specified elsewhere, is understood to also apply to all conductors (wire, cable or bus as applicable), including those provided as part of factory assembled components such as panelboards, panelettes, overcurrent protection and switching devices. This restriction applies equally to all such equipment regardless indications (or lack thereof) elsewhere to the contrary. Aluminum will not be acceptable.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Advance Products & Systems, Inc.
 - 2) Calpico, Inc.
 - 3) Metraflex Co.
 - 4) Pipeline Seal and Insulator, Inc.
 - 5) Or Approved Equal

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 TOUCH UP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc rich paint recommended by item manufacturer.

2.5 ACCESS DOOR IN FINISHED CONSTRUCTION

- A. Access doors as required for operation and maintenance of concealed equipment, valves, controls, etc. will be provided by another trade.
 1. This Trade is responsible for access door location, size and its accessibility to the outlet box, junction box, or equipment being served.
 2. Coordinate and prepare a location, size, and function schedule of access doors required and deliver to a representative of the installing trade.
 3. Access doors are of ample size, minimum of 16 inches x 16 inches (40 cm. x 40 cm.).

PART 3- EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

- E. Right of Way: Give to piping systems installed at a required slope.

3.3 ROUGH-IN

- A. Verify final locations for rough ins with field measurements and with the requirements of the actual equipment to be connected.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
- I. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping".
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

3.5 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.

- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.7 FOUNDATIONS

A. General

- 1. All equipment, including but not limited to Switchgear, and Switchboards, are provided with foundations.
- 2. Each piece of equipment is set on a concrete base minimum 4 inches (10 cm.) high and extending 3 inches (8 cm.) beyond the equipment in all directions. Bases are integrally keyed to structural slab.

3.8 REFINISHING AND TOUCH UP PAINTING

- A. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
- B. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
- C. Restore damage to galvanized finishes with zinc rich paint recommended by manufacturer.

3.9 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Touch up painting.

3.10 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

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SECTION 26 05 05

SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: Selective Demolition for Electrical

1.3 GENERAL REQUIREMENTS

- A. Work of this section must be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install work of this Section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.4 REFERENCES

- A. Perform the work of this section in accordance with the requirements of Section 26 05 00 "Common Work Results for Electrical".

1.5 SYSTEM INTERRUPTIONS

- A. The existing Bomb Squad Compound will be occupied and in operation during the performance of the Work.
 - 1. When necessary to temporarily disconnect any existing feeder or branch circuit supplying occupied facilities, confer with the Commissioner and schedule a mutually agreeable period of interruption.
 - 2. Where replacement, relocation or modification of existing equipment is indicated, provide and maintain temporary feeders, connections, circuit protection, and any other materials and appurtenances required to maintain services to occupied areas.
- B. No work must be left incomplete, nor any hazardous situation created, which will affect the life or safety of the public and/or building occupants. At no time must the work interfere with or cut off any of the existing services without the Commissioner's prior written permission. Do not tamper with fire protection devices including covering smoke detectors or turning off sprinkler valves. Work that may cause a trouble or alarm condition on the fire alarm system or sprinkler system (dust, sprinkler flow, heat, electrical work, etc.) must be performed only after temporarily shutting down the respective life safety system. Shut downs must be arranged and scheduled at least 24 hours in advance and coordinated with the Commissioner.



- C. The City of New York reserves the right to operate existing electrical and mechanical equipment not included in this work, and to perform required servicing and repairs to same, at all times.
- D. The work indicated and/or specified must be carried out with a minimum of interference to the established operations of the compound.

1.6 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Sections 01 40 00 "Quality Requirements"

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products and materials furnished for the work of this section must comply with Division 26 Specifications.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXISTING ELECTRIC WORK AND REMOVALS

- A. It is the intent of these specifications to remove existing wiring in the existing building and grounds and replace with new. Existing conduit must be reused in place only where indicated on the drawings or with specific approval of the Commissioner.
- B. Remove, reroute or relocate any conduit, wiring, lighting fixtures, outlets, and other electrical items that are laid bare in the course of, or interfere with, the alterations. Remove exposed outlets, conduit and branch circuit work which interfere with the alterations.
- C. Compare the plans with the existing conditions to determine the amount of work affected. Remove unused exposed circuit work, outlets, fixtures and the like not required by the alterations.
- D. Materials to be removed and not reinstalled under this Division of the Work, unless otherwise indicated, must become the property of the Contractor and must be removed from the site.
- E. Feeders and branch circuits to be removed: conductors and cables must be completely removed back to their source. Exposed or accessible conduits must be removed completely; conduits embedded in concrete or masonry must be cut off flush and the surface patched smooth and level.



- F. Existing low voltage wiring, telecommunications and/or data systems wiring, fire alarm wiring, and security system wiring not scheduled to be reused must be removed in its entirety as required by NEC Articles 640, 645, 725, 760, 770, 800, 820, and 830. Wiring must not be abandoned and left in place.

3.3 DISPOSAL OF REMOVED MATERIALS

- A. Removed materials must be disposed of using licensed carting service.
- B. Hazardous materials including polychlorinated biphenyl (PCB) substances as found in transformers, switchgear, lighting ballasts, mercury contaminated materials as found in fluorescent lamps, and the like must be disposed of by an EPA approved, licensed disposal service. Contractor must obtain and have on file, waste disposal manifest and receipts stating how and where the waste was disposed of or converted as follows:
 - 1. Fluorescent light ballasts must be collected and disposed of as hazardous waste containing PCB's unless expressly labeled "No PCB's".
 - 2. Fluorescent lamps must be collected and disposed of as hazardous waste containing mercury.
 - 3. Electrical transformers are located within the project. If work involves draining of the oil from the transformer(s), the oil must be assumed to be PCB contaminated until testing proves otherwise.
 - 4. Room temperature controlling thermostats that contain mercury switches must be collected and disposed of as hazardous waste containing mercury.
- C. The work specified under this section specifically excludes the removal, sealing and/or patching of hazardous materials. This includes but is not limited to asbestos, PCBs and/or any other material having been designated by the Environmental Protection Agency as a hazardous material. If this contractor finds anything which is suspected of being a hazardous material, it should be immediately brought to the Commissioner's attention.

END OF SECTION 26 05 05



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SECTION 26 05 10

ELECTRICAL TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Electrical Testing Requirements

1.3 DESCRIPTION

- A. General - The Contractor must completely test and inspect all systems in accordance with the specifications and drawings. The Contractor must certify that all systems are in complete working order prior to turning over to the City of New York.

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

1.6 GENERAL TESTING

- A. It will be the responsibility of this Contractor to furnish all testing equipment and labor necessary to perform the following tests.
1. After wires or cables are in place, but before being connected to devices and equipment, the system must be tested for shorts, opens, intentional and unintentional grounds by means of wires in conduit that are shorted or unintentionally grounded must be replaced.
 2. A voltage test must be made on the last outlet of each branch circuit and the potential drop must not exceed 2.5%. Voltage drops for panel and large feeders must not exceed 2.5%, hence the total voltage drop for a feeder and any branch circuit must not exceed 5% of the service voltage. The test must be made under design load or its equal.
 3. Any wiring device, or electrical apparatus in this contract, if grounded or shorted on an integral "line" part, must be removed and the problem rectified.
 4. When required, complete test and inspection records must be made and incorporated into a report for each piece of equipment tested. All readings taken must be recorded. Four (4) copies must be submitted to the Commissioner for approval.



5. All tests must be conducted in the presence of Commissioner.

1.7 ELECTRICAL INSPECTION

- A. The Contractor must conspicuously attach a "Safety Tag" to the disconnection device of each circuit, receptacle, machine tool, plant equipment or utility channel prior to electrical connection.
- B. Upon completion of the work, the Contractor must certify, by checking the inspection column of the Safety tag and signing, that the work was inspected and completed in accordance with these Specifications and is safe to energize. All testing and troubleshooting of the construction work must be done by the Contractor prior to completing the safety tag.
- C. Indicate in the "comment" section of the Safety Tag, all abnormal installations or items that require further attention by maintenance or another trade.
- D. Prior to City of New York accepting an installation as complete, all items on the Safety Tag must be satisfied and accepted by signature of Commissioner.
- E. The New York City Building Department must inspect work. Furnish the original Certificate of inspection to the Commissioner.
 - 1. Temporary inspection of electrical work for temporary construction power for the job site and Contractor's trailers requiring power.
 - 2. Temporary inspection of building primary and secondary power systems, before energizing building permanent power.
 - 3. Final inspection of the complete electrical system, submitting the final payment requisition at end of project.
- F. The Contractor must assist the Commissioner during the walk-through. Furnish a satisfactorily completed Pre-Occupancy Safety Checklist to the Commissioner.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT AND MATERIALS

- A. The Contractor must provide all testing instruments, equipment and all materials, connections etc. required to perform tests in accordance with these specifications.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 WIRING TEST

- A. The wiring and cable tests must be made before any circuits, main switches, motors, transformers, or feeders are energized.
- B. Tests must be made for continuity, identification and absence of shorts and grounds for each



conductor. Both ends of a given conductor must be identified alike. Before circuit terminal connections are made, continuity and identification of wiring must be checked by means of a DC test device using a bell, light, meter, or buzzer.

C. Insulation Resistance (IR) tests must be made using Meggers at the following values:

1. 208Y/120 Volt Wiring at 500 Volts DC

3.3 LIGHTING TEST

A. Check all lighting fixtures for proper operation. All Contractor supplied fixtures to be 100% operable at no additional cost to the City of New York.

3.4 MOTOR TEST

- A. Division 23 trade to perform tests in coordination with Electrical trade.
- B. All 208/120V motors must be "spot tested" with 500V DC in a similar manner. The minimum resistance to ground must be 2000 meg-ohm (corrected to 20 degrees C).

3.5 PANELBOARD TESTS

A. Test all equipment to be operated on the 208/120V system at 500V DC prior to connecting feeders. A minimum insulation resistance of 2000 meg-ohms must be obtained between all phases and between phase and neutral, and phase and ground.

3.6 SPOT TEST

A. "Spot Test" mentioned in this section must be interpreted as the specific test method of obtaining insulation resistance by applying indicated test voltage for 60 seconds to the equipment or wiring being tested.

3.7 CONTROL WIRING/OUTLET TEST

- A. Control wiring must perform the function as noted in operation methods and/or included schematics and single line diagrams. Proper operation will be verified by Commissioner.
- B. All 120-volt outlets must be tested with a Daniel Woodhead Cat. No. 1750 and 1760 tester under the supervision of the Project Coordinator. Minimum acceptable tension is 4 oz. for NEMA 5-15R, and 5-20R, 6-15R, 6-20R, 7-15R, 7-20R, 14-15R, 14-20R, 15-15R and 15-20R receptacles.

3.8 CERTIFICATION

- A. Assist the Commissioner during the Pre-Occupancy Checklist walk-through.
- B. Test all systems for proper operation, code compliance, and standards compliance. (Note: Lighting fixtures, devices, and panels must be tested in a manner that does not affect the equipment', components', or accessories' performance.)
- C. The Contractor must co-sign a certified letter attesting to the completing of testing and submit two (2) copies of said signed and certified letter each to the Commissioner.



- D. The Contractor and Manufacturer's Representative must co-sign a certified letter attesting to the completion of testing of special systems, such as dimming systems, emergency power systems and fire alarm systems. Submit two (2) copies of said signed and certified letter each the Commissioner.
- E. Perform testing at a time convenient to Convenient to the Commissioner. The Contractor must pay costs associated with the scheduling, performance, and completion of the testing.

END OF SECTION 26 05 10



SECTION 26 05 13

MEDIUM-VOLTAGE CABLE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: Medium-Voltage Cable.

1.3 GENERAL REQUIREMENTS

- A. Work of this section must be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.4 REFERENCES

- A. Perform the work of this section in accordance with the requirements of Section 26 05 00 "Common Work Results for Electrical".
- B. See other Division 26 sections for requirements of medium voltage equipment and systems not included herein.

1.5 MATERIALS, EQUIPMENT AND SYSTEMS

- A. Factory wiring of components must conform to state and local codes and laws.
- B. The criteria of design and performance to produce the required operation is based on equipment of the named manufacturers. Equipment of other manufacturers will be considered, subject to acceptability in the Commissioner's judgment and opinion. The equipment must conform to the dimensions established by the drawings for mechanical spaces and other clearances.
- C. Materials and products provided must be suitable for, and where applicable UL listed and labeled for, the intended use or application.

1.6 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Submit manufacturers' technical product data for the following:



1. Cable construction specs and data.
2. Warranty.
3. Installation instructions and recommendations.
4. Splicing equipment and kits.
5. Terminating equipment and kits.
6. Manufacturer's factory test data.
7. Recommended field test procedures.

- C. After installation and field acceptance testing, submit certified field test reports.
- D. Submit sample length of cable for review to include complete jacket labeling and not less than 16-inches long.

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Condition 01 40 00 "Quality Requirements"
- B. Installer: Engage a cable splicer, trained and certified by splice material manufacturer, to install, splice, and terminate medium-voltage cable.
- C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to the utility company and electrical inspector.
- D. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- E. Source Limitations: Obtain cables and accessories through one source from a single manufacturer.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.
- G. Comply with IEEE C2 and NFPA 70.

1.8 WARRANTY

- A. The manufacturer must warrant that the cable to be furnished is of first class material and workmanship throughout, and that cable is free from defects in design, material or workmanship, for a period of 40 years when installed, terminated and operated within acceptable industry practices. The manufacturer must agree to replace any defective section of cable free of charge, and extend the same warranty on the replacement cable.

PART 2 - PRODUCTS

2.1 MEDIUM VOLTAGE CABLE (15 kV)

- A. This specification covers single conductor shielded power cable, suitable for installations in underground ducts, conduits, and direct burial in wet locations.



B. Industry Standards

1. ICEA S-93-639
2. NEMA WC 74
3. AEIC CS-8
4. UL-1072 (For Type MV-105 Cables)
5. ASTM, B-496 – Compact Strand
6. IEEE 383

C. Conductor

1. Uncoated copper, Type MV-105, Class B compact round, concentric lay, minimum 98% conductivity at 20°C.

D. Conductor Screen

1. Extruded layer of semiconducting ethylene-propylene rubber thermosetting compound, or high-dielectric stress control layer.

E. Insulation

1. Thermosetting compound of ethylene-propylene rubber (EPR), extruded over conductor screen.
2. Discharge, ozone, and heat-resistant, rated 105°C for normal operation.
3. Thickness: 133% thickness.

F. Insulation Screen

1. Layer of semi-conducting ethylene-propylene rubber thermosetting compound extruded over the insulation.

G. Shielding: Copper tape or solid corrugated copper wires, helically applied over semiconducting insulation shield.

H. Concentric Neutral

1. The concentric neutral must consist of bare copper wires, meeting the requirements of ASTM B-3, spirally wound over the insulation shielding with uniform spacing between wires, 1/3 of phase capacity for single phase and full capacity for three phase.

I. Overall Jacket

1. Provide low smoke, zero halogen (LSZH) thermosetting jacket complying with ICEA T-33-655 and ASTM E662. The jacket must be free stripping from the insulation screen and must be printed with the following legends:



- a. Manufacturer's Name and Cable Type (Trade Name)
- b. Conductor Size
- c. CU (Conductor Material)
- d. Voltage
- e. 133%
- f. Insulation Thickness
- g. Sequential Footage Number (as applicable)
- h. Year of Manufacture

J. Production Tests

1. Conductor electrical resistance requirements, insulation resistance, and high voltage tests must be in accordance with standards.
2. Voltage withstand, tested for 5 minutes minimum, must be 47 kV AC and 94 kV DC, minimum.

K. Shipping

1. Cable reels must be shipped in an upright position supported by both outside flanges.
2. Water tight seals must be applied to cable ends to prevent the entrance of moisture during transit, storage and installation.

L. Manufacturer:

1. Kerite
2. Okonite
3. General Cable
4. Or approved equal

2.2 SPLICING EQUIPMENT AND KITS

- A. Comply with IEEE 404; provide type as recommended by cable or splicing kit manufacturer for the application.
- B. Splice kits must be pre-molded cold shrink EPDM rubber, waterproof, capable of passing ANSI C119.1-1986 water immersion tests, heat-shrink type or approved equal, compatible with the cable construction, dimensions, and materials. Taped splices are not acceptable.
- C. Manufacturers: 3M Electrical Products Division, RTE Cooper Power Systems or Thomas & Betts Corporation Elastimold or approved equal.

2.3 TERMINATIONS

- A. Type recommended by cable manufacturer to type of cable and installation conditions, including orientation.
- B. Class 1 (outdoors) or Class 2 (indoors) per IEEE 48. Class 3 is not acceptable.



- C. Manufacturers: 3M Electrical Products Division, RTE Cooper Power Systems or Thomas & Betts Corporation Elastimold or approved equal.

2.4 SEPARABLE INSULATED CONNECTORS

- A. Description: Modular system, complying with IEEE 386, with disconnecting, single pole cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture.
- B. Load-Break Cable Terminators: Elbow-type units with 200 ampere load make/break and continuous current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body; capacitance coupled.
- C. Dead-Break Cable Terminators: Elbow-type units with 600 ampere continuous current rating; designed for de-energized disconnecting and connecting; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body; capacitance coupled.
- D. Dead-Front Terminal Junctions: Modular bracket-mounted groups of dead-front stationary terminals that mate and match with above cable terminators. Two-, three-, or four-terminal units as indicated, with fully rated, insulated, watertight conductor connection between terminals and complete with grounding lug, manufacturer's standard accessory stands, stainless-steel mounting brackets, and attaching hardware.
 - 1. Protective Cap: Insulating, electrostatic-shielding, water-sealing cap with drain wire.
 - 2. Portable Feed-Through Accessory: Two-terminal, dead-front junction arranged for removable mounting on accessory stand of stationary terminal junction.
 - 3. Grounding Kit: Jumpered elbows, portable feed-through accessory units, protective caps, test rods suitable for concurrently grounding three phases of feeders, and carrying case.
 - 4. Standoff Insulator: Portable, single dead-front terminal for removable mounting on accessory stand of stationary terminal junction. Insulators suitable for fully insulated isolation of energized cable-elbow terminator.
- E. Test-Point Fault Indicators: Applicable current-trip ratings and arranged for installation in test points of load-break separable connectors, and complete with self-resetting indicators capable of being installed with shotgun hot stick and tested with test tool.
- F. Tool Set: Shotgun hot stick with energized terminal indicator, fault-indicator test tool, and carrying case.

2.5 FAULT INDICATORS

- A. Indicators: Automatically resetting time delay, current type fault indicator with inrush restraint feature, arranged to clamp to cable sheath and provide a display after a fault has occurred in cable. Instrument must not be affected by heat, moisture, and corrosive conditions and must be recommended by manufacturer for installation conditions.



- B. Manufacturer: as per ConEd standards.

2.6 ARC-PROOFING MATERIALS

- A. Tape for First Course on Metal Objects: 10-mil- (250-micrometer-) thick, corrosion-protective, moisture-resistant, PVC pipe-wrapping tape.
- B. Arc-Proofing Tape: Fireproof tape, flexible, conformable, intumescent to 0.3 inch (8 mm) thick, compatible with cable jacket.
- C. Glass-Cloth Tape: Pressure-sensitive adhesive type, 1/2 inch (13 mm) wide.
- D. Manufacturer: 3M Scotch 77 Fire Retardant Arc Proofing Tape with banding of Scotch 69 Glass Cloth Electrical Tape; Plymouth-Bishop 53 Plyarc Arc and Fire Proofing Tape; Industrial Energy Products “Hot-Stop” XLN Tape; A&M Tape Products, or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION OF MV CABLES AND ACCESSORIES

- A. Install cables according to IEEE 576.
- B. Pull Conductors: Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
 - 1. Where necessary, use manufacturer-approved pulling compound or lubricant that will not deteriorate conductor or insulation.
 - 2. Use pulling means, including fish tape, cable, rope, and basket-weave cable grips that will not damage cables and raceways. Do not use rope hitches for pulling attachment to cable.
- C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- D. Support cables according to Division 26 Section 26 05 00 “Common Work Results for Electrical”
- E. In manholes, handholes, pull boxes, junction boxes, and cable vaults, train cables around walls by the longest route from entry to exit and support cables at intervals adequate to prevent sag.
- F. Install cable splices at pull points and elsewhere as indicated; use standard kits.
- G. Install terminations at ends of conductors and seal multiconductor cable ends with standard kits.
- H. Install separable insulated-connector components as follows:



1. Protective Cap: At each terminal junction, with one on each terminal to which no feeder is indicated to be connected.
 2. Portable Feed-Through Accessory: Three.
 3. Standoff Insulator: Three.
- I. Arc Proofing: Unless otherwise indicated, arc proof medium-voltage cable at locations not protected by conduit, cable tray, direct burial, or termination materials. In addition to arc-proofing tape manufacturer's written instructions, apply arc proofing as follows:
1. Clean cable sheath.
 2. Wrap metallic cable components with 10-mil (250-micrometer) pipe-wrapping tape.
 3. Smooth surface contours with electrical insulation putty.
 4. Apply arc-proofing tape in one half-lapped layer with coated side toward cable.
 5. Band arc-proofing tape with 1-inch- (25-mm-) wide bands of half-lapped, adhesive, glass-cloth tape 2 inches (50 mm) o.c.
- J. Install fault indicators on each phase where indicated.
- K. Ground shields of shielded cable at terminations, splices, and separable insulated connectors. Ground metal bodies of terminators, splices, cable and separable insulated-connector fittings, and hardware.
- L. Install cables of less than 500 foot length without intermediate splices unless otherwise indicated.
- M. Install #4/0 XHHW insulated copper ground conductor with each circuit.
- N. Prior to application of termination and splice kits, verify that sufficient space is available in the box, enclosure, or manhole enclosing each such termination or splice.
- O. Label covers of pullboxes and junction boxes for systems operating over 600 volts with readily visible lettering at least ½-inch high warning "DANGER HIGH VOLTAGE KEEP OUT."
- P. Tag cables where they terminate, splice, tap, enter, and leave manholes, handholes, vaults, switchgear, substations or boxes. Tags must be brass and approximately 1-1/4" square and 3/32" thick. The marking must identify the number and size of the conductors in the cable, date, manufacturer, circuit number, voltage, and phase. Minimum ¼ inch indented lettering and fastened with non-ferrous metal bands approximately 3/8" wide.

3.3 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
1. Perform each visual and mechanical inspection and electrical test stated in InterNational



Electrical Testing Association (NETA) Acceptance Testing Specifications (ATS). Certify compliance with test parameters.

2. After installing medium-voltage cables and before electrical circuitry has been energized, test for compliance with requirements.
 3. Remove and replace malfunctioning units and retest as specified above.
- B. During or immediately after installation of cables and prior to energizing, conduct acceptance insulation testing using high voltage DC methods. Measure leakage current and insulation resistance applying a 15 minute test duration.
- C. Infrared Scanning: After Substantial Completion, but not more than two months after Final Acceptance, perform an infrared scan of terminations, splices, and modular connections. Make connections accessible to a portable scanner and perform scanning during a period of normal working load as advised by the Commissioner.
1. Follow-up Infrared Scanning: Perform one additional follow-up infrared scan at same locations as before, 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or detect significant deviations from normal values. Provide calibration record for scanning device used for electrical distribution equipment.
 3. Record of Infrared Scanning: Prepare a certified report identifying all connections checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 05 13

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes building wires and cables and associated splices, connectors, and terminations for wiring systems rated 600 volts and less.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: for each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Listing and Labeling: Provide products specified in this Section that are Underwriters Laboratories listed and labeled.
 - 1. The Terms "Listed and Labeled": As defined in the "National Electrical Code," Article 100.
- C. Comply with NFPA 70, as amended by state and local codes.

1.5 WARRANTY

- A. The power conductors shall be warranted for 10 years from substantial completion.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers:
 - 1. American Insulated Wire Corp.; a Leviton Company.
 - 2. General Cable Corporation.



3. Senator Wire & Cable Company.
 4. Southwire Company.
 5. Belden, Division Cooper Industries.
 6. Cable & Wire Division, AT&T.
 7. Pyrotenax.
 8. Or Approved Equal
- B. Refer to Article 3.2 "Wire and Insulation Applications" for insulation type, cable construction, and ratings.
1. Conductor Material: Copper complying with NEMA WC 5 or 7; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
 2. Conductor Insulation Types: Type THHN, THWN, XHHW complying with NEMA WC 5 or 7.
- C. Where required by code, or where indicated on the drawings, feeders and circuitry are 2- hour rated cable or cable system, except where enclosed within 2-hour rated construction indicated on the architectural drawings.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers:
1. AFC Cable Systems, Inc.
 2. AMP Incorporated/Tyco International.
 3. Hubbell/Anderson.
 4. O-Z/Gedney; EGS Electrical Group LLC.
 5. 3M Company; Electrical Products Division.
 6. Or Approved Equal
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 WIRE AND INSULATION APPLICATIONS

- A. Utilize copper conductors with THWN, THHN or XHHW insulation, except provide THHW-2, THWN-2 or XHHW-2 insulation for conductors 1/0 and larger in "wet" locations. Conductors utilized in underground installations are UL Listed for use in wet locations. Conductors are run in raceways as described in Section 26 05 33 "Raceways and Boxes for Electrical Systems". Type THHW and THHW-2 are not utilized where excluded by conduit sizing. Type THWN are not utilized for connection to 100% rated overcurrent devices.
- B. In general, cable ampacities are based on a 60 degree C rating for cables #1 AWG and smaller and on a 75 degree C rating for larger cables.
- C. Low voltage circuits intended for the distribution of voice or data utilize communications cables (complying with requirements of Article 800 of the National Electrical Code) having characteristics as follows:
 - 1. Cables are of a fluoropolymer type having adequate fire-resistant and low-smoke producing characteristics and are U.L. listed for plenum use (Type CMP), except that where run in conduit, they may be U.L. type CM.
 - 2. Refer to Section 28 46 00 "Fire Detection and Alarm" for firealarm system wiring.

3.3 INSTALLATION

- A. Conceal cables in finished walls, ceilings and floors unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables, parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- E. Support cables according to Section 26 05 00 "Common Work results for Electrical".
- F. Seal with firestopping around cables penetrating fire-rated elements.
- G. Identify wires and cables according to Section 26 05 53 " Identification for Electrical Work " and Section 26 05 29 "Hangers and Supports for Electrical Systems".

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.
- D. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.
- E. Join solid conductors #8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors #8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected. Terminals and connectors are U.L. approved specifically for the application.
- F. Join, tap and terminate stranded conductors #6 AWG and larger by means of solder sleeves, taps and lugs with applied solder or by means of pressure indent type connectors, or mechanical connectors utilizing ball tipped set screws. Apply pressure indent type connectors, utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector. Factory installed equipment or device terminals are of types UL approved specifically for the application.
- G. Except where wire nuts are used, build up insulation over conductor joints to a value equal both in thickness and dielectric strength to that of the factory applied conductor insulation. Insulation of conductor taps and joints are by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.
- H. Exclude splicing procedures for neutral conductors in lighting and appliance branch circuitry which utilize device terminals as the splicing points.
- I. Exclude joints or terminations utilizing solder in any conductors used for grounding or bonding purposes.
- J. Exclude all but solder or pressure indent type joints in conductors used for signaling or communications purposes.

3.5 INSTALLATION OF CIRCUITRY FOR MISCELLANEOUS LOW VOLTAGE SYSTEMS

A. Comply with requirements described in applicable subsections of this Section.
Note the following circuitry requirements for low voltage systems:

1. Wiring for miscellaneous low voltage systems may be run without conduit - subject to the approval by Commissioner - except where prohibited by other sections of these specifications or by indications on the drawings.
2. Where conduit is required, it is steel electric metallic tubing (EMT), except that it is galvanized intermediate steel conduit where located within 8 feet (2.4 m) of the floor in mechanical spaces (or is otherwise exposed to mechanical damage).
3. Wires and cables have characteristics - in compliance with Articles 725 and/or 800 (as applicable) of the National Electrical Code - as described elsewhere in the specifications or drawings for this project, and are U.L. listed in accordance therewith.
4. Where wires and cables are permitted to be run without conduit, they are independently supported from the building structure or ceiling suspension systems at intervals not exceeding four feet on center, utilizing cable supports specifically approved for the purpose. Wires and cables do not rest on or depend on support from suspended ceiling media (tiles, lath, plaster, as well as splines, runners or bars in the plane of the ceiling), nor are they supported from pipes, ducts or conduits. Where cables are bundled together, separate bundles are provided separately for each type of cabling and separately for each independent system. Bundling and/or supporting ties are of a type suitable for use in a ceiling air handling plenum regardless of whether or not installed in a plenum.
5. Cables are tagged or labeled at each termination point and in each intermediate junction box, pull box or cabinet through which they pass.
6. Comply with applicable requirements for locating and routing circuitry, for installing circuitry, and for fire-stopping as described in other sub-section of this Section.

3.6 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19



SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented in other sections of these Specifications.

1.3 RELATED SECTIONS

- A. Division 26 05 13 Section "Medium Voltage Cables."
- B. Division 26 05 19 Section "Low-Voltage Electrical Power Conductors."
- C. Division 26 05 33 Section "Raceways and Boxes for Electrical Systems."

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product Data: For each type of product indicated.
- C. Field Test Reports: Written reports specified in Part 3.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by Underwriters Laboratories, Inc.
 - 1. Comply with UL 467.
- C. Comply with NFPA 70, as amended by New York City Electrical Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS



- A. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
 - 1. Thomas & Betts, Electrical
 - 2. Erico Products, Inc.
 - 3. Ideal Industries, Inc.
 - 4. O-Z/Gedney Co.
 - 5. Or Approved Equal.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors"
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Grounding Electrode Conductors: Stranded cable.
- E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- F. Bare Copper Conductors: Comply with the following:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Assembly of Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
- G. Copper Bonding Conductors: As follows (except where otherwise indicated):
 - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 0.25-inch (6.4 mm) in diameter.
 - 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 - 3. Bonding Jumper: Bare copper tape, braided bare copper No. 3/0 AWG conductors, terminated with copper ferrules; 1.625 inch (42 mm) wide and 1/16 inch (1.5 mm) thick.
 - 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper No. 30 AWG conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/26 inch (1.5 mm) thick.
- H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.



- B. Connectors: Bolted-pressure-type connectors, or compression type.
- C. Bolted Clamps: Heavy-duty type.
- D. Pressure Connectors: High-conductivity-plated units.
- E. Welded Connections: Exothermic-welded types, in kit form, and selected per manufacturer's written instructions for the specific types, sizes, and combinations of conductors and other items to be connected.

2.4 GROUNDING ELECTRODES

- A. Metal Underground Water Pipe: Metal, underground water pipe in direct contact with earth for at least 10-feet (3-meters) and electrically continuous from the points of connection of the electrode conductor and the bonding conductors. Interior metal water pipes located more than 5-feet from the building must not be used.
- B. Metal Frame of Building or Structure: Any of the following methods are deemed an acceptable means of making an earth connection through the metal frame of the building structure:
 - 1. At least 10-feet of a single structural metal member in direct contact with earth or encased in concrete which is in direct contact with earth.
 - 2. Structural metal frame is bonded to at least one of the grounding electrodes defined above.
 - 3. Other approved means of establishing a connection to earth.
- C. Electrodes Not Permitted for Grounding:
 - 1. Gas piping systems which are metal and underground.
 - 2. Aluminum electrodes.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 APPLICATION

- A. Equipment Grounding Conductor Application: Comply with New York City Electrical Code NEC Article 250 for sizes and quantities of equipment grounding conductors, except where specific types, larger sizes or more conductors are indicated.
 - 1. Use raceway as the equipment ground conductor where feasible and permitted by Code for the following:
 - a. Feeders and branch circuits except as otherwise indicated or as described elsewhere in this Section.
 - b. Feeders.



- c. Lighting circuits.
 - d. Receptacle circuits.
 - e. Single-phase motor or appliance branch circuits.
 - f. Three-phase motor or appliance branch circuits.
- B. Signal and Communications: For telephone, alarm, voice and data and other communication systems, provide a #4 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each service location, antenna terminal cabinet, wiring closet and central equipment location.
- C. The ground bus of switchboards switchgear must be connected to the main grounding electrode by means of insulated grounding electrode conductors run in intermediate metallic conduit and sized as per Code.
- D. The main grounding electrode must be an accessible point on the nearest metallic main water service pipe. Connection must be made on the street side of the main valve utilizing a ground clamp of a type specifically manufactured for the purpose. Bonding jumpers must be provided around the water meters (if provided) and around insulating joints and/or sections, utilizing conductors sized as per Code and run in IMC. Bond the structural steel to the grounding electrode system.
- E. The water pipe ground must be supplemented by an additional "made" electrode consisting of buried ground rods copper plates laid on 3 inch (75 mm) charcoal bed, and provided in sufficient quantity so as to have a measured resistance to ground of not more than 25 ohms. Establish a bonding connection from the "made" electrode consisting of green insulated conductors run in IMC and sized as per Code.
- F. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers. Bonding jumpers must be sized equal to the grounding electrode conductors.
- G. Provide grounding bonds for all metallic conduits of the light and power system which terminate at (or in pits below) distribution equipment for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually to the ground bus.
- H. Provide supplementary ground bonding to maintain continuity of the equipment and raceway grounding system as follows:
- 1. Bonding jumpers applied where wiring devices (receptacles and switches) are not equipped with approved self-grounding features. Include any necessary field modifications for termination of the bonding jumpers so as to ensure grounding continuity.
 - 2. Bonding jumpers applied to ensure that grounding continuity does not depend solely on the supporting screws fastening metallic enclosures together.



3. Include any necessary field modifications for termination of the bonding jumpers to ensure grounding continuity.
- I. Bond the reinforcing bars in concrete to the nearest grounding electrode.
 - J. The neutral of secondary winding of each low voltage (i.e., less than 600 volts) transformer must be grounded to the grounding electrode as specified hereinafter by means of an insulated grounding conductor sized as per Code and run in IMC. The neutral of each transformer must be bonded to the transformer enclosure by means of an insulated conductor sized as per code. If not, factory installed the jumper must be field installed within the transformer enclosure.
 - K. Where specifically noted on the drawings, or described hereinbefore in this Section, include insulated equipment and raceway grounding conductors run within the raceways. Where insulated equipment grounding conductors required for feeders have not been included in the quantities of conductors indicated on the drawings, incorporate such conductors in accordance with the following table. Adjust conduit sizing if required.

OCD AMPS	GROUNDING CONDUCTOR (CU)
15,20	#12
25-60	#10
70-100	#8
110-200	#4
225-400	*#2
500-600	*2 x #1
700-800	*2 x 1/0
1000	*3 X 2/0
1200	*4 X 3/0
1600	*5 X 4/0
2000	*6 X 250 KCMIL
2500	*7 X 350 KCMIL
* Adjust quantity (if needed) to match number of conduits in run.	



3.3 INSTALLATION

- A. General: Ground electrical systems and equipment according to NFPA 70, as amended by New York City Electrical Code requirements, except where Drawings or Specifications exceed such requirements.
- B. Grounding Conductors: Route along the shortest and straightest paths possible, except as otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Metal Water Service Pipe: Provide insulated copper grounding conductors, sized as indicated, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding-clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Do not install a grounding jumper across dielectric fittings. Bond grounding-conductor conduit to conductor at each end.
- D. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding-clamp connectors.

3.4 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
- B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.



- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage an electrical testing organization to perform tests described below.
- B. Tests: Subject the completed grounding system to a Megger test at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Measure ground resistance not less than 2 full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the fall-of-potential method according to IEEE 81.
- C. Maximum grounding resistance must be 25 ohms.
- D. Excessive Ground Resistance: Where resistance to ground exceeds specified values, provide additional grounding to achieve required results.
- E. Report: Prepare test reports, certified by the testing organization, of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results.
- F. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

END OF SECTION 26 05 26



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SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 PERFORMANCE REQUIREMENTS

- A. Engineering Services: Design supports for multiple raceways, including comprehensive engineering analysis by professional engineer licensed in the State of New York, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For steel slotted support systems.
- C. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.
 - D. Welding certificates.

1.5 QUALITY ASSURANCE



- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Or Approved Equal
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be malleable iron.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NECA 1. Minimum rod size must be 1/4 inch in diameter.

3.3 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.



- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing- paint to restore and comply with ASTM A 780.

END OF SECTION 26 05 29



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SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 and marked for intended use.
- C. Comply with NFPA 70, as amended by state and local codes.

1.5 RELATED SECTIONS:

- A. Section 26 05 29 “Hangers and Supports for Electrical Systems” for raceway and box supports.
- B. Section 26 05 33 “Raceways and Boxes for Electrical Systems” for devices installed in boxes and for floor- box service fittings.

1.6 DEFINITIONS

- A. Rigid Steel Conduit: ANSI C80.1.
- B. EMT: Electrical metallic tubing.



- C. ENT: Electrical non-metallic tubing.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metallic conduit.
- G. RNC: Rigid nonmetallic conduit.

1.7 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system and partition assemblies.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alflex Corp
 - 2. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
 - 3. LTV Steel Tubular Products Company.
 - 4. Wheatland Tube Co.
 - 5. Triangle PWC, Inc.
 - 6. Or approved equal.
- B. Rigid Steel Conduit: ANSI C80.1
- C. IMC: ANSI C80.6.
- D. EMT and Fittings: ANSI C80.3.
 - 1. Fittings: Set-screw or compression.
- E. FMC: Zinc coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings: NEMA FB1; compatible with conduit and tubing materials.



H. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.

2.2 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hoffman.
2. Square D
3. The Wiremold Company
4. Approved equal.

B. Material and Construction: Sheet metal sized and shaped as indicated.

1. Dry locations: NEMA 250, Type1.
2. Damp or Wet locations: NEMA 250, Type 3R.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for a complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: Screw-cover type.

F. Finish: Manufacturer's standard enamel finish.

2.3 SURFACE RACEWAYS

A. Surface Metal Raceway: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Thomas & Betts Corporation.
 - b. Walker Systems, Inc; Wiremold Company (The)
 - c. The Wiremold Co., Electrical Sales Division.
 - d. Approved equal.

B. Types, sizes and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.4 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS



- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Arnco Corporation.
 - 2. Endot Industries Inc.
 - 3. IPEX Inc.
 - 4. Lamson & Sessions; Carlon Electrical Products.
 - 5. Or Approved Equal
- B. Description: Comply with UL 2024; flexible type, approved for general-use installation.

2.5 BOXES, ENCLOSURES AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Crouse-Hinds; Div. Of Cooper Industries, Inc.
 - 2. Emerson/General Signal; Appleton Electric Company.
 - 3. Erickson Electrical Equipment Co.
 - 4. Hoffman.
 - 5. Hubbell, Inc.; Killark Electric Manufacturing Co.
 - 6. O-Z/Gedney; Unit of General Signal.
 - 7. RACO; Division of Hubbell, Inc.
 - 8. Spring City Electrical Manufacturing Co.
 - 9. Thomas & Betts Corporation.
 - 10. Walker Systems Inc.; Wiremold Company (The).
 - 11. Approved Equal
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1. Boxes must be sized to in accordance with the New York City Electrical Code.
- F. Cast Metal Pull and Junction Boxes: NEMA FP 1 cast aluminum with gasketed cover. Boxes must be sized to in accordance with the New York City Electrical Code.



- G. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and associated hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.
- H. Pull boxes for Telephone and Signal System Raceways: ANSI/EIA/TIA-569A

2.6 FACTORY FINISHES

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 RACEWAY APPLICATION

- A. Outdoors: Use the following wiring methods, except as specifically noted otherwise.
 - 1. Exposed: Rigid steel (RGS)
 - 2. Concealed: Rigid steel or IMC.
 - 3. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, electric solenoid, or motor driven equipment): LFMC.
 - 4. Boxes and Enclosures: NEMA 250, Type 3R or 4.
 - 5. Underground Conduit: RNC, Sch 80-PVC or RGS encased in concrete.
 - 6. Underground Conduit for Fire Pump: RGS encased in concrete
- B. Indoors: Use the following wiring methods:
 - 1. IMC for all purposes and in all applications except where specifically excluded, or where alternate methods are specified below.
 - 2. Normal feeders to fire pump: Rigid steel conduit. Normal feeder conduit encased in 2 inches (5cm) of concrete (or other approved equivalent) where conduits are not physically routed outside the building. Exclude concrete for jockey pumps and/or auxiliary pumps.
 - 3. Utilize EMT for:
 - a. Main and submain feeders.



- b. Branch feeders.
 - c. Lighting and appliance branch circuitry.
 4. Exposed lighting and appliance branch circuitry runs in: Surface metal raceway.
 5. Refer to appropriate Sections of Division 26 for additional requirements relating to wiring methods for control/signal transmission, fire alarm systems, telecommunications, and other communication and alarm system distribution.
 6. Wiring methods listed above must be restricted as follows:
 - a. Exclude EMT from concrete embedment, from locations where subject to mechanical damage and from exposed locations in finished spaces.
 - b. Exclude surface metal raceway from concealed installations, from locations where subject to mechanical damage and from wet or damp locations.
 - c. Exclude armored cable from exposed locations and from runs opening into wet or damp locations.
 - d. Exclude armored cable (Type AC) from areas of public assembly and all spaces (including voids of walls and ceilings) not separated therefrom by fire rated construction adequate for the purpose.
 - e. Utilize only intermediate or rigid steel conduit from runs in (or opening into) hazardous areas. Comply with electric code requirements regarding sealing fittings, boxes, enclosures as appropriate for the conditions of atmospheric contamination.
 7. The following must be treated as damp or wet locations within building confines, regardless of whether a high ambient moisture level is found to exist:
 - a. Spaces where any designations indicating weatherproof (WP) or vaporproof (VP) appear on the drawings.
 - b. Outside of waterproofing in foundation walls in contact with grade.
 - C. Minimum Raceway Size: 3/4 inch trade size.
 - D. Indicated Raceway Size: Raceway sizes indicated are based on non-flexible conduit. Where flexible type raceways are specified, increase raceway size as required to maintain code mandated maximum conduit fill.
 - E. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.3 INSTALLATION



- A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceway as specified in Section 26 05 29 "Hangers and Supports for Electrical Systems."
- D. Install temporary closures to prevent foreign matter from entering raceway.
- E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- F. Make bends and offsets so the inside diameter is not reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
 - 1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
- H. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- I. Join raceways with fittings designed and approved for the purpose and make joints tight.
 - 1. Use insulating bushings to protect conductors.
- J. Tighten set screws of threadless fittings with suitable tool.
- K. Equip all raceways which cross building expansion or control joints, with expansion fittings having flexible grounding bonds bypassing sliding parts.
- L. Terminations:
 - 1. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely, and install the locknuts with dished part against the box. Use two locknuts, one inside and one outside box.
 - 2. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples



are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

- M. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-lb (90 kg) tensile strength. Leave not less than 12 inches (300 mm) of slack at each end of the pull wire.
- N. Telephone and Signal System Raceways 2-Inch Trade Size (DN 53) and Smaller: In addition to the above requirements, install in maximum lengths of 100 feet (30 m) and with a maximum of two 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements. Pull or junction boxes must be sized in accordance with ANSI/EIA/TIA-569A guidelines.
- O. Install raceway sealing fittings according to the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:
 - 1. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.
 - 2. Where otherwise required by the NFPA70.
- P. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- Q. Flexible Connections: Use maximum of 6 feet (1.8 m) of FMC for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in wet or damp locations. Install separate ground conductor across flexible connections.
- R. Install hinged cover enclosures and cabinets plumb. Support at each corner.

3.4 LOCATING AND ROUTING CIRCUITRY

- A. All circuitry must be run concealed except that if must be run exposed:
 - 1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
 - 2. Horizontally and vertically in mechanical equipment spaces.
 - 3. Horizontally and vertically in electric equipment rooms.
- B. Concealed circuitry must be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.



3.5 INSTALLING JUNCTION, PULL AND OUTLET BOXES

- A. Apply junction and pull boxes in accordance with the following:
1. Include pull boxes in long straight runs of raceway to assure that cables are not damaged when they are pulled in.
 2. Include junction and pull boxes to assure a neat and workmanlike installation of raceways.
 3. Include junction and pull boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in raceway between cable access points, the accessibility of cable joints and splices, and the application of cable supports.
 4. Where the wires and cables following the same routing are indicated as running through separate pull boxes, it must be understood that a segregation of the wires and cables is required. Separately indicated pull boxes may be incorporated into single boxes on condition that segregation is maintained by barriers of the type hereinafter specified.
 5. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).
- B. Apply outlet boxes in accordance with the following:
1. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures must not be used as replacements for the boxes specified herein unless they are specifically rated to accept "through circuit" building wires.
 2. A continuous row of fixtures of the end-to-end channel type, designed for "through wiring," and wired in accordance with the specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.
 3. Multiple local switches indicated at a single location must be gang mounted in a single outlet box.
 4. Include all required outlet boxes regardless of indications on the drawings (which due to symbolic methods of notation, may omit to show some of them).
 5. Regardless of any indications on the drawings, flush wall mounted outlet boxes must not be set back-to-back in fire rated walls or partitions, even if they are displaced vertically. Such outlets must be offset horizontally by 24 inches (610mm) or as otherwise required to maintain the fire rating.



6. Flush wall mounted outlet boxes in non-fire rated construction must not be set back-to-back, but must be offset at least 12 inches (30 cm) horizontally regardless of any indication on the drawings.
- C. Install junction boxes, pull boxes and outlet boxes in accordance with the following:
1. Exclude surface mounted outlet boxes in conjunction with concealed circuitry.
 2. Exclude unused circuitry openings in junction and pull boxes. In larger boxes each such opening must be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.
 3. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes must be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes must be closed with sheet metal knock-out plugs.
 4. Pack "through the wall" collar type outlet boxes with a sound deadening, non-hardening, non-hygroscopic, non-combustible, high dielectric stuffing material manufactured specifically for the purpose.
 5. Outlet boxes for switches must be located at the strike side of doors. Indicated door swings are subject to field change. Outlet boxes must be located on the basis of final door swing arrangements.
 6. Boxes and plaster covers for duplex receptacles must be arranged for vertical mounting of the receptacle.
 7. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.
- D. Barriers in junction and pull boxes of outlet size must be of the same metal as the box.
- E. Barriers in junction and pull boxes which are larger than outlet size must be of polyester resin fiberglass of adequate thickness for mechanical strength but in no case less than 1/4 inch (6.5mm). Each barrier must be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.6 MOUNTING HEIGHTS

- A. Heights of all wall mounted outlets and equipment must be in accordance with the following list. (Dimensions are above finished floor unless noted.)
1. Receptacle or telephone outlet in field constructed wall, partition or column unless otherwise specified below -- 18 inches (45 cm) to centerline.
 2. Receptacle or telephone outlet in factory fabricated wall or partition, unless otherwise specified below -- Dimension determined by wall or partition construction.



3. Receptacle or telephone outlet in mechanical spaces, electric switchboard rooms, electric closets -- 60 inches (150 cm) to centerline.
 4. Toggle switch outlet in field constructed wall partition or column -- 46 inches (117 cm) to centerline.
 5. Toggle switch outlet in factory fabricated wall or partition -- Dimension determined by wall or partition construction.
 6. Bracket lighting outlets, except for "over door" -- 90 inches (228 cm) to centerline.
 7. Bracket lighting outlet over door -- as required to center outlet between top surface of door lintel and underside of ceiling.
 8. Wall exit sign except for over door -- 90 inches (228 cm) to centerline.
 9. Exit sign over door -- As required to center sign between top surface of door lintel and underside of ceiling.
 10. Outlet for any signal system device other than fire alarm station requiring manual operation – 46 inches (117 cm) to centerline.
 11. Manual fire alarm station -- 46 inches (117 cm) to centerline.
 12. Outlet for any signal system visual or sounding device other than fire alarm visual device or visual/sounding device -- As required for device to clear underside of ceiling by 1 inch (25 mm).
 13. Outlet for fire alarm visual device -- Visual device 80 inches (203 cm) AFF, except as otherwise noted.
 14. Clock outlet -- As required for clock to clear underside of ceiling by 1 inch (25 mm).
- B. Architectural drawings and field instructions issued by the Commissioner take precedence over the above list and must be adhered to.

3.7 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that coatings, finishes, and cabinets are without damage or deterioration at Substantial Completion.
1. Restore damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 2. Restore damage to PVC or paint finishes with matching touch-up coating recommended by the manufacturer.

3.8 CLEANING



- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and restore damaged finishes.

END OF SECTION 26 05 33



SECTION 26 05 43

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: Underground Ducts and Raceways for Electrical Systems.

1.3 GENERAL REQUIREMENTS

- A. Work of this Section must be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install work of this Section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.4 REFERENCES

- A. Perform the work of this Section in accordance with the requirements of Section 26 05 00 “Common Work Results for Electrical”.

1.5 MATERIALS, EQUIPMENT AND SYSTEMS

- A. Factory wiring of components must conform to state and local codes and laws. Refer to specification 26 05 00 “Common Work Results for Electrical” section 1.8 for the list of local codes and laws.
- B. The criteria of design and performance to produce the required operation is based on equipment of the named manufacturers. Equipment of other manufacturers will be considered, subject to acceptability in the Commissioner's judgment and opinion. The equipment must conform to the dimensions established by the drawings for mechanical spaces and other clearances.
- C. Materials and products provided must be suitable for, and where applicable UL listed and labeled for, the intended use or application.

1.6 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit manufacturer's product data and shop drawings for the following:



1. Manholes and Handholes Plans, Details, Sections and Elevations.
2. Installation Instructions and Recommendations for Manholes and Handholes.
3. Concrete and Rebar Design Data.
4. Cable Supports and Accessories.
5. Covers and Frames.

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide conduits, ducts, manholes, handholes, and accessories as indicated and specified, and as required for a complete underground raceway system.
- B. Provide materials and equipment listed by UL when such equipment is available.
- C. Conduit must be rigid hot-dipped galvanized steel for sweeps and risers and plastic for runs, and as specified on drawings and conforming to the following:
 1. Rigid Steel: Rigid galvanized steel conduit and fittings must conform to the requirements of UL 6, ANSI C80-1 and NEC Article 346. Fittings and couplings must be threaded.
 2. Plastic duct for concrete encasement must be Schedule 40 PVC and must conform to NEMA TC2. Fittings must conform to NEMA TC9.
 3. Plastic duct for direct burial must be Schedule 40 PVC and must conform to NEMA TC2 and NEC Article 347.
- D. Pull rope must be synthetic and having a minimum tensile strength of 500 pounds.
- E. Provide a fiberglass ladder for each manhole entry.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. See Section 26 05 00 “Common Work Results for Electrical”.

3.3 UNDERGROUND INSTALLATION



- A. Underground installation must conform to National Electrical Code and National Electrical Safety Code.
- B. Underground duct with concrete encasement must be constructed of individual conduits encased in concrete. The concrete encasement surrounding the bank must be rectangular in cross-section and must provide at least 3 inches of concrete cover around ducts. Separate conduits by a minimum concrete thickness of 2 inches, except electric conduits must be separated from low voltage or signal system conduits by a minimum concrete thickness of 6 inches if combined in the same envelope.
1. The top of the concrete envelope must have a minimum burial depth no less than that permitted by NEC Article 300, Section 300.50, and must have a maximum depth to the top of the ductbank of 30 inches below grade.
 2. Duct banks must have a continuous slope downward toward manholes and handholes and away from building foundations with a minimum pitch of 3 inches in 100 feet. Except at conduit risers, changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, must be accomplished by long sweep bends having a minimum radius of curvature of 25 feet; sweep bends may be composed of one or more curved or straight sections or combinations thereof. Manufactured bends must have a minimum radius of 18 inches for use with conduits of less than 3 inches in diameter, and a minimum radius of 36 inches for ducts of 3 inches in diameter and larger.
 3. Terminate conduits in end-bells where ducts enter manholes and handholes. Stagger the joints of the conduits by rows and layers to strengthen the duct bank. Provide plastic duct spacers that interlock vertically and horizontally. Spacer assembly must consist of base spacers, intermediate spacers, and top spacers to provide a completely enclosed and locked-in duct bank. Install spacers per manufacturer's instructions. Before pouring concrete, anchor duct bank assemblies to prevent the assemblies from floating during concrete pouring.
 4. Connect to existing concrete encasement, foundations and concrete structures using dowels. Connect to manhole and handhole walls using dowels.
 5. Prior to installing cables in underground duct banks, and plugs and pullropes in empty ducts, ensure that each duct is clear after rodding with a mandrel and left clean and dry.
 6. Conduit indicated as being unused or empty must be provided with plugs on each end. Plugs must contain a weep hole or screen to allow water drainage. Provide a pullrope having 3 feet of slack at each end of unused or empty conduits.
 7. Where it is necessary to cut the tapered end on a piece of conduit at the site, the cut and/or taper must be made with a special tool or a lathe, so that the new taper matches the taper of the particular conduit being used.
- C. Grounding
1. Manholes and Handholes: Install a driven grounding rod close to wall and set rod depth so 4 inches (100 mm) will extend above finished floor. Where necessary, install grounding rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from grounding rod into manhole through a



waterproof sleeve in manhole wall. Protect grounding rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

2. Connections to Manhole Components: Connect exposed metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to grounding rod or grounding conductor. Make connections with minimum No. 4 AWG stranded, hard-drawn copper wire. Train conductors plumb or level around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.
 3. Grounding System: Ground pad-mounted equipment and noncurrent-carrying metal items by connecting them to underground cable and grounding electrodes.
- D. Concrete for electrical work must conform to the requirements of Division 3.
- E. Underground duct without concrete encasement must be constructed of individual conduits and must be direct buried in the earth upon a 6 inch deep sand or granular bed and cover. Direct-buried conduits must have a minimum burial depth no less than that permitted by NEC Article 300, Section 300.50, and must have a maximum depth to the top of the conduits of 36 inches below grade.
- B. Provide detectable tape manufactured specifically for warning and identification of buried cable and conduit. See Specification Section 26 05 00 “Common Work Results for Electrical” for details. Bury tape with the printed side up at a depth of 12 inches below the top surface of earth or the top surface of the subgrade under pavements.
- F. Excavating, backfilling, and compacting must be as specified in Division 31.
- G. Set handholes and in-ground cast boxes on a bed of minimum 6 inch deep compacted granular fill. Set manholes on a bed of minimum 24 inch deep compacted granular fill. Installation and assembly must be per manufacturer's instructions.
- H. Set handhole access covers flush with finished grade.
- I. Install grout, caulk, and/or sealant as required at construction joints and duct entries to make watertight.
- J. Separately rack and train conductors of different systems to provide maximum separation. For example, rack and train normal and emergency conductors or different voltage conductors on opposite walls of manholes and handholes.

END OF SECTION 26 05 43



SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Electrical identification materials and devices required to comply with ANSI C2, NFPA 70, NYC Electrical Code, OSHA standards.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Product Data: For each electrical identification product indicated.
- C. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Comply with NFPA 70 NYC Electrical Code.
- C. Comply with ANSI A13.1 and NFPA 70 for color-coding.
- D. Comply with ANSI Z535-4 and NFPA 70E.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS

- A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
 - 1. Color: Black letters on orange field.
 - 2. Legend: Indicates voltage and service.
- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over laminated



with a clear, weather- and chemical-resistant coating.

- C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide ((0.08 mm thick by 25 to 51 mm wide)).
- E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- ((0.4-mm-)) hick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.
- H. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch ((0.05 mm)) thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.
- I. Brass or Aluminum Tags: 2 by 2 by 0.05-inch ((51 by 51 by 1.3-mm)) metal tags with stamped legend, punched for fastener.

2.2 NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch ((1.6 mm)) thick for signs up to 20 sq. in. ((129 sq. cm)) and 1/8 inch ((3.2 mm)) thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch ((6.4-mm)) grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch ((1-mm)) galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch ((6.4-mm)) grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32,



stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch ((5 mm)).
2. Tensile Strength: 50 lb ((22.3 kg)) minimum.
3. Temperature Range: Minus 40 to plus 185 deg F ((Minus 40 to plus 85 deg C)).
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Install painted identification according to manufacturer's written instructions and as



follows:

1. Clean surfaces of dust, loose material, and oily films before painting.
 2. Prime surfaces using type of primer specified for surface.
- F. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches ((51 mm)) wide, completely encircling conduit.
 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot ((15-m)) maximum intervals in straight runs, and at 25-foot ((7.6-m)) maximum intervals in congested areas.
 3. Apply the following colors to the systems listed below:
 - a. Fire Alarm System: Red.
- G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- H. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.
1. Color-code 208/120-V system as follows:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral: White.
 - e. Ground: Green.
 2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
 - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-(25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identifi-



cation markings.

- b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.
- I. Medium Voltage Service Conductors: Color-code throughout the medium voltage system. This will be read in conjunction with Specification 260513 Medium Voltage Cables.
 1. Color-code 4160V system as follows:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral: White.
 - e. Ground: Green.
- J. Power Circuit Identification: Separately identify each power circuit, cable or feeder at each termination, and at each pull box, junction box, vault and manhole through which it passes.
 1. Non-ferrous metallic tags or wrap-around bands for outdoor or underground use.
 2. Plasticized card stock tags or wrap-around labels for indoor use.
 3. Stamped or embossed letters (1/4" high) identifying feeder or circuit by number and origin.
- K. Apply warning, caution, and instruction signs as follows:
 1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Include as a minimum warnings of Arc-Flash hazards and identification of series-rated devices. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- L. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label;



where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Switchboards.
4. Electrical substations.
5. Emergency system boxes and enclosures.
6. Disconnect switches.
7. Motor starters.
8. Transfer switches.
9. Contactors
10. Dimmers.
11. Control devices.
12. Fire alarm master station or control panel.
13. Device wall plates
14. Lighting Control Panels
15. Fire Alarm Pull Boxes
16. Fire Alarm Remote Smoke Detectors
17. All other Fire Alarm Devices
18. Lamps
19. Luminaires

END OF SECTION 26 05 53

SECTION 26 05 85

PROVISIONS FOR ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. This section includes power, lighting, communications, and alarm provisions for elevators.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Comply with NYC Electrical Code for devices and installation.
- C. Listing and Labeling: Provide products that are Underwriter’s Laboratories listed and labeled for their applications and installation conditions and for the environments in which installed.
 - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 APPLICATION

- A. In addition to the power feeder and disconnect switch at the entry to the room for the elevator, as shown on the drawings, further electrical work is required as described



hereinafter.

3.3 INSTALLATION

- A. Provide disconnect switch “in sight” of the hoist motor. This switch must be interposed in the feeder to the elevator controller at a suitable location approved as “in sight” by Commissioner.
- B. The disconnects switches located at the entry to the room must be of the switch and fuse type. Fuses must be sized to 175% of the nameplate rating, elevator motor, full load amps or as recommended by elevator supplier and / or manufacturer.
- C. Unless exceeded by requirements shown on the drawings, or elsewhere in the specifications, provide equipment, circuitry and/or roughing for elevator appurtenances as follows:
 - 1. Provide a single circuit 20 amps, 120-volt supply including a fused padlock-able disconnect switch located in the elevator machine room or machine space, from an emergency lighting panel to the elevator controller.
 - 2. Provide a single circuit 20 amp, 120 volt supply for a “top of shaft trail cable outlet box”.
 - 3. Provide a vapor-tight switch, GFCI duplex receptacle and 100 watt lighting fixture with globe and guard. Devices must be mounted in elevator pit at location as directed in field. Provide circuitry as required.
 - 4. Provide a “run/by” switch, receptacle and light of type described above. Provide circuitry as required.
 - 5. Provide secondary (sheave) level switch light and receptacle, complete with circuitry, as described hereinbefore.
 - 6. Provide a single 20 amp, 120 volt circuit to the elevator intercom panel (or to the group controller if there is not separate intercom panel).
 - 7. Provide a fused disconnect switch, adjacent to the controller for each connection to a controller.
 - 8. Provide 1 -inch empty conduit (intended for elevator communication, signaling and alarm) to the elevator dispatcher’s panel.
 - 9. Provide a 2" empty conduit (intended for closed circuit TV cables) run to the concierges desk security office or elsewhere as directed by the Commissioner. Conduit must terminate in CCTV junction box at both ends of run.
 - 10. Provide ceiling smoke detector giving total coverage for the elevator machine room. Provide similar smoke detector at the top of elevator shaft. Connect the detectors together and into the fire alarm system. If any of the smoke detectors goes into alarm mode, after a short, adjustable time delay, a signal must be transmitted to shut down the power to the elevator served and then utilized



integral back-up batteries to initiate Phase I elevator recall and recall elevator cab to the predetermined evacuation floor. Elevator power must be able to be re-energized from the fire command station. Provide appropriate electrically operated devices required for the elevator shut-down.

11. The hoistway and machine room smoke detector must also energize hoistway and elevator machine room smoke vent hatch actuator from the fire alarm system. The hatchways must be manually closed.

END OF SECTION 26 05 85



**Department of
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Construction**

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SECTION 26 08 00
COMMISSIONING OF ELECTRICAL

PART 1 - GENERAL

GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This section includes commissioning process requirements for Electrical systems, assemblies, and equipment.
- B. Related Sections:
1. DDC General Conditions – Section 01 91 13 “General Commissioning Requirements for MEP Systems.”

1.3 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the City of New York with an unbiased, objective view of the system’s installation, operation and performance. This process does not eliminate or reduce the responsibility of the Contractor to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the City of New York.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the Contractor.
 2. Verify and document proper performance of equipment and systems.
 3. Verify that Operation & Maintenance documentation is complete and transferred to the City of New York.
 4. Verify that the City of New York’s maintenance personnel are adequately instructed.
- C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance checkouts.
- D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx activities with the Commissioner and Contractor.
- E. The Cx process shall not reduce the responsibility of the Contractor to comply with the Contract

Documents.

1.4 DEFINITIONS

- A. Refer to the DDC General Conditions for definitions.

1.5 SUBMITTALS

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s role.
- B. Refer to the DDC General Conditions Section 01 33 00 “Submittal Procedures” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for specific requirements.
- C. In addition, provide the following:
 - 1. Certificates of readiness
 - 2. Certificates of completion of installation, prestart, and startup activities.
 - 3. O&M manuals
 - 4. Test reports

1.6 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: The Contractor will comply with test equipment manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. The Contractor shall provide all standard testing equipment for the electrical systems and controls systems in Division 26. The Contractor shall ensure a sufficient quantity of two-way radios are provided.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.
- C. The Contractor shall ensure that proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the CxA, but

shall not become the property of the City of New York.

- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems
- B. Red-lined Drawings:
1. The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
 2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 4. The Contractor will create the as-built drawings.
- C. Operation and Maintenance Data:
1. The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
 2. The CxA will review the O&M literature once for conformance to project requirements.
 3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Instruction:
1. The Contractor will provide demonstration and instruction as required by the Contract Documents.
 2. A complete instruction plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any instruction.
 3. An instruction agenda for each instruction session must be submitted to the CxA one (1) week prior the instruction session.
 4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and the Commissioner. A copy of the test record shall be provided to the CxA and the Commissioner.
 5. Engage a Factory-authorized service representative to instruct the City of New York's maintenance personnel to adjust, operate, and maintain specific equipment.

6. Instruct the City of New York's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests as per the written procedure and at the direction of the CxA.
- B. Attend construction phase controls coordination meetings.
- C. Participate in Electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- D. Provide information requested by the CxA for final commissioning documentation.
- E. Include requirements for submittal data, operation and maintenance data, and instruction in each purchase order or sub-contract written.
- F. Prepare preliminary schedule for Electrical system orientations and inspections, operation and maintenance manual submissions, instruction sessions, equipment start-up and task completion for the City of New York. Distribute preliminary schedule to commissioning team members.
- G. Update schedule as required throughout the construction period.
- H. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for all commissioned equipment.
- I. Perform all verification and functional performance tests in the presence of the CxA as required.
- J. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
- K. Gather operation and maintenance literature on all equipment and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.
- L. Coordinate with the CxA to provide 72-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
- M. Notify the CxA a minimum of two weeks in advance for start of the testing work.
- N. Participate in, and schedule vendors and subcontractors to participate in the instruction sessions.
- O. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
 1. Electrical equipment including switchgear, panel boards, motor control centers, lighting, receptacles, and all other equipment furnished under this Division.
 2. Fire alarm system
 3. Lighting System
- P. The Contractor shall ensure that the equipment suppliers shall document the performance of the equipment.



- Q. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.
- R. Provide instruction to the City of New York’s maintenance personnel using expert qualified personnel, as specified.
- S. Contractor shall direct equipment suppliers to:
 - 1. Provide all requested submittal data, including detailed start-up procedures and specific requirements needed to keep warranties in force.
 - 2. Assist in equipment testing.
 - 3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- T. Refer to the DDC General Conditions for additional Contractor responsibilities.

3.3 CxA'S RESPONSIBILITIES

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the CxA that Electrical systems, subsystems, and equipment have been installed, meggerred, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the CxA that Electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of Electrical testing shall include the entire Electrical installation, from the incoming power equipment throughout the distribution system. Testing shall include measuring, but not limited to resistance, voltage, and amperage of system(s) and devices.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency



- conditions, and verify proper response of building automation system controllers and sensors.
- D. Prepare detailed testing plans, procedures, and checklists for Electrical systems, subsystems, and equipment with guidance from CxA.
 - E. Tests will be performed using design conditions whenever possible, as determined by the Commissioner.
 - F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
 - G. The CxA may direct that set points be altered when simulating conditions is not practical.
 - H. If tests cannot be completed because of a deficiency outside the scope of the Electrical system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.
 - I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.6 ELECTRICAL SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 26 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CxA.
- B. Electrical Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 26. Assist the CxA with preparation of testing plans.
- C. Fire Detection and Alarm System Testing: Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- D. Electrical Distribution System Testing: Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested
- E. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The scope of commissioning work shall include but not limited to the following equipment and systems:
 - 1. Lighting Control System (20% Sampling)
 - 2. Main Distribution Panel
 - 3. Sub Panels
 - 4. 150 kVA Transformer
 - 5. Automatic & Manual Transfer Switches
 - 6. Generator Docking Station
 - 7. PV Arrays

8. Six (6) Inverters
9. Associated Electrical Work

3.7 OPERATION AND MAINTENANCE MANUALS

- A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements.
- B. Refer to the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for the Commissioner and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.8 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

- A. Refer to the DDC General Conditions Section 01 79 00 “Demonstration and Owner’s Pre-Acceptance Orientation” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to instruction.
- B. Contractor’s instruction responsibilities pertaining to Electrical work:
 1. Provide the CxA with an instruction plan four weeks before the planned instruction.
 2. Provide comprehensive instruction in the understanding of the systems and the operation and maintenance of each major piece of commissioned electrical equipment or system to city of New York’s maintenance personnel.
 3. Instruction shall be recorded by the CxA and start with classroom sessions, if necessary, followed by hands on instruction on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing subcontractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment is required. More than one party may be required to execute the instruction.
 6. The instruction sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
 7. Instruction shall include:
 - a. Use the printed installation, operation and maintenance instruction material included in the O&M manuals.
 - b. Include a review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare



parts inventory suggestions. The instruction shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.

- c. Discuss relevant health and safety issues and concerns.
- d. Discuss warranties and guarantees.
- e. Cover common troubleshooting problems and solutions.
- f. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
- g. Discuss any peculiarities of equipment installation or operation.
 - i. Hands-on instruction shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance of all pieces of equipment.
 - ii. Fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.
 - iii. Instruction shall occur after functional testing is complete, unless approved otherwise by the Commissioner.

END OF SECTION 26 08 00



SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes a networked lighting control system comprised of the following components:
1. System Software Interfaces
 - a. Management Interface
 - b. Visualization Interface
 2. System Backbone and Integration Equipment
 - a. System Controller
 - b. Digital Time Clock
 3. Wired Networked Devices
 - a. Wall Stations
 - b. Graphic Wall Stations
 - c. Digital Key Switches
 - d. Auxiliary Input/Output Devices
 - e. Occupancy and Photocell Sensors
 - f. Wall Switch Sensors
 - g. Embedded Sensors
 - h. Power Packs and Secondary Packs
 - i. Networked Luminaires
 - j. Relay and Dimming Panel
 - k. Bluetooth Low Energy Programming Device
 - l. Communication Bridge
- B. The networked lighting control system must meet all the characteristics and performance requirements specified herein.
- C. The contractor must provide, install and verify proper operation of all equipment necessary for proper operation of the system as specified herein and as shown on applicable drawings.

1.3 RELATED DOCUMENTS

- A. Section 26 27 26 Wiring Devices

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"



- B. Submittal must be provided including the following items.
 - 1. Bill of Materials necessary to install the networked lighting control system.
 - 2. Product Specification Sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
 - 3. Riser Diagrams showing device wiring connections of system backbone and typical per room/area type.
 - 4. Information Technology (IT) connection information pertaining to interconnection with facility IT networking equipment and third-party systems.
 - 5. Other Diagrams and Operational Descriptions – as needed to indicate system operation or interaction with other system(s).
 - 6. Contractor Startup/Testing Worksheet must be completed prior to factory start-up.
 - 7. Hardware and Software Operation Manuals.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Product Qualifications
 - 1. System electrical components must be listed or recognized by a nationally recognized testing laboratory (e.g., UL, ETL, or CSA) and must be labeled with required markings as applicable.
 - 2. System luminaires and controls are certified by manufacturer to have been designed, manufactured and tested for interoperability.
 - 3. All components must be subjected to 100% end of line testing prior to shipment to the project site to ensure proper device operation.
 - 4. All components and the manufacturing facility where product is manufactured must be RoHS compliant.
- C. Installation and Startup Qualifications
 - 1. System startup must be performed by qualified personnel properly trained by the manufacturer.

1.6 PROJECT CONDITIONS

- A. Only install indoor equipment after the following site conditions are maintained:
 - 1. Ambient Temperature: 14 to 105 degrees F (-10 to 40 degrees C)
 - 2. Relative Humidity: less than 90% non-condensing
- B. Equipment must not be subjected to dust, debris, moisture, or temperature and humidity conditions exceeding the requirements indicated above or as marked on the product, at any point prior to installation.
- C. Only properly rated equipment and enclosures, installed per the manufacturer’s instructions, may be subjected to dust and moisture following installation.



1.7 WARRANTY

- A. The manufacturer must provide a minimum one-year warranty on all hardware devices supplied and installed. Warranty coverage must begin from date of substantial completion.
- B. The hardware warranty must cover restoration of any defective products within the warranty period.
- C. The manufacturer must make available new parts, upgrades, and/or replacements available for a minimum of 5 years following substantial completion.

PART 2 - EQUIPMENT

2.1 MANUFACTURERS

- A. Manufacturers
 - 1. Acuity Brands Lighting, Inc.
 - 2. Lutron
 - 3. Watt Stopper
 - 4. Approved equal

2.2 SYSTEM COMPLIANCE

- A. System components must comply with UL 916 and UL 924 standards where applicable.
- B. System components must comply with CFR Title 47, Part 15 standards where applicable.
- C. System components must comply with ISED Canada RSS-247 standards where applicable.
- D. All equipment must be installed and connected in compliance with NFPA 70.

2.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. System Architecture
 - 1. System must have an architecture that is based upon three main concepts:
 - a. Networkable intelligent lighting control devices,
 - b. Standalone lighting control zones using distributed intelligence,
 - c. Optional system backbone for remote, time based and global operation.
 - 2. Intelligent lighting control devices must have individually addressable network communication capability and consist of one or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 0-10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these components into a single device enclosure must be permissible so as to minimize overall device count of system.
 - 3. System must be capable of interfacing directly with networked luminaires such that either low voltage network cabling or wireless RF communication is used to interconnect networked luminaires with control components such as sensors, switches and system



- backbone (see “Control Zone Characteristics” sections for each type of network connection, wired or wireless).
4. Networked luminaires and intelligent lighting control devices must support unique configuration of device settings and properties, with such configuration residing within the networked luminaires and intelligent control devices.
 5. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices and must be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wall stations without requiring connection to a higher-level system backbone; this capability is referred to as “distributed intelligence.”
 - a. Lighting control zones (of at least 128 devices per zone must be supported.
 6. Networked luminaires and intelligent lighting control devices must have distributed intelligence programming stored in non-volatile memory, such that following any loss of power the lighting control zones must operate according to their defined default settings and sequence of operations.
 7. Lighting control zones must be capable of being networked with a higher-level system backbone to provide time based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software interface.
 8. The system may include one or more system controllers that provide time-based control. The system controller also provides a means of connecting the lighting control system to a system software interface and building management systems via BACnet/IP or BACnet MS/TP protocol.
 9. All system devices must support firmware update, either remotely or from within the applications space, for purposes of upgrading functionality at a later date.
- B. Wired Networked Control Zone Characteristics
1. Connections to devices within a wired networked lighting control zone and to backbone components must be with a single type of low voltage network cable, which must be compliant with CAT5e specifications or higher. To prevent wiring errors and provide cost savings, the use of mixed types of low voltage network cables must not be permitted.
 2. Devices in an area must be connected via a “daisy-chain” topology; requiring all individual networked devices to be connected back to a central component in a “hub-and-spoke” topology must not be permitted, so as to reduce the total amount of network cable required for each control zone.
 3. System must provide the option of having pre-terminated plenum rated low voltage network cabling supplied with hardware so as to reduce the opportunity for improper wiring and communication errors during system installation.
 4. Following proper installation and provision of power, all networked devices connected together with low voltage network cable must automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g. software application, handheld remote, pushbutton). The “out of box” default sequence of operation is intended to provide typical sequence of operation so as to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.
 5. Once software is installed, system must be able to automatically discover all connected devices without requiring any provisioning of system or zone addresses.



6. All networked devices must have the ability to detect improper communication wiring and blink its LED in a specific cadence as to alert installation/startup personnel.
7. Networked control devices intended for control of egress and/or emergency light sources must not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices must be provided for egress and/or emergency light fixtures:
 - a. Low-Voltage power sensing: These devices must automatically provide 100% light level upon detection of loss of power sensed via the low voltage network cable connection.
 - b. UL924 Listed Line-Voltage power sensing: These devices must be listed as emergency relays under the UL924 standard, and must automatically close the load control relay and provide 100% light output upon detection of loss of power sensed via line voltage connection to normal power.
8. Networked luminaires and intelligent lighting control devices located in different areas must be able to transmit and track information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. Occupancy and photocell commands must be available across a single controller, and switch commands must be available across single or multiple controllers. These must also be referred to as global control zones.
9. Wired networked Wall stations must provide the follow Scene Control Capabilities:
 - a. Preset Scenes that can activate a specific combination of light levels across multiple local and global channels, as required.
 - b. Profile Scenes that can modify the sequence of operation for the devices in the area (group) in response to a button press. This capability is defined as supporting “Local Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage. Wall stations must be able to manually start and stop Local Profiles, or the local profile must be capable of ending after a specific duration of time between 5 minutes and 12 hours. Parameters that must be configurable and assigned to a Local Profile must include, but not be limited to, fixture light level, occupancy time delay, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wall stations.
 - c. 3-way / multi-way control: multiple wall stations must be capable of controlling the same local and global control zones, so as to support “multi-way” preset scene and profile scene control.

C. System Integration Capabilities

1. The system must interface with third party building management systems (BMS) to support two-way communication using the industry standard BACnet/IP or BACnet MS/TP protocols. The following system integration capabilities must be available via BACnet/IP and BACnet MS/TP protocols:
 - a. The system must support control of individual devices, including, but not limited to, control of relay and dimming output.
 - b. The system must support reading of individual device status information. The available status will depend on the individual device type and capabilities, which



may include but not be limited to, relay state, dimming output, power measurement, occupancy sensor status, and photocell sensor states or readings. All system devices must be available for polling for devices status.

- c. The system must support activation of pre-defined system as outlined in the para 2.3 D “Supported Sequence of Operations”

D. Supported Sequence of Operations

1. Control Zones

- a. Networked luminaires and intelligent lighting control devices installed in an area (also referred to as a group of devices) must be capable of transmitting and tracking occupancy sensor, photocell sensor, and manual switch information within at least 48 unique control zones to support different and reconfigurable sequences of operation within the area. These must also be referred to as local control zones.

2. Wall station Capabilities

- a. Wall stations must be provided to support the following capabilities:
 - 1) On/Off of a local control zone.
 - 2) Continuous dimming control of light level of a local control zone.
- b. 3-way / multi-way control: multiple wall stations must be capable of controlling the same local control zones, so as to support “multi-way” switching and/or dimming control.

3. Occupancy Sensing Capabilities

- a. Occupancy sensors must be configurable to control a local zone.
- b. Multiple occupancy sensors must be capable of controlling the same local zones. This capability combines occupancy sensing coverage from multiple sensors without consuming multiple control zones.
- c. System must support the following types of occupancy sensing sequence of operations:
 - 1) On/Off Occupancy Sensing
 - 2) Partial-On Occupancy Sensing
 - 3) Partial-Off Occupancy Sensing
 - 4) Vacancy Sensing (Manual-On / Automatic-Off)
- d. On/Off, Partial-On, and Partial-Off Occupancy Sensing modes must function according to the following sequence of operation:
 - 1) Occupancy sensors must automatically turn lights on to a designated level when occupancy is detected. To support fine tuning of Partial-On sequences the designated occupied light level must support at least 100 dimming levels.
 - 2) Occupancy sensors must automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level must support at least 100 dimming levels.
 - 3) To provide additional energy savings the system must also be capable of combining Partial-Off and Full-Off operation by dimming the lights to a designated level when vacant and then turning the lights off completely after an additional amount of time.
 - 4) Photocell readings, if enabled in the Occupancy Sensing control zone, must be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage.



- Additional requirements and details for photocell sensing capabilities are indicated under “Photocell Sensing Capabilities.”
- 5) The use of a wall station must change the dimming level or turn lights off as selected by the occupant. The lights must optionally remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, must proceed.
- e. Vacancy Sensing mode (also referred to as Manual-On / Automatic-Off) must function according to the following sequence of operation:
- 1) The use of a wall station is required turn lights on. The system must be capable of programming the zone to turn on to either to a designated light level or the previous user light level. Initially occupying the space without using a wall station must not result in lights turning on.
 - 2) Occupancy sensors must automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level must support at least 100 dimming levels.
 - 3) To provide additional energy savings and an enhanced occupant experience, the system must also be capable of dimming the lights when vacant and then turning the lights off completely after an additional amount of time.
 - 4) To minimize occupant impact in case the area or zone is still physically occupied following dimming or shutoff of the lights due to detection of vacancy, the system must support an “automatic grace period” immediately following detection of vacancy, during which time any detected occupancy must result in the lights reverting to the previous level. After the grace period has expired, the use of a wall station is required to turn lights on.
 - 5) Photocell readings, if enabled in the Occupancy Sensing control zone, must be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under “Photocell Sensing Capabilities”.
 - 6) At any time, the use of a wall station must change the dimming level or turn lights off as selected by the occupant. The lights must optionally remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, must proceed.
- f. To accommodate diverse types of environments, occupancy time delays before dimming or shutting off lights must be specifiable for control zones between 15 seconds to 2 hours.
4. Photocell Sensing Capabilities (Automatic Daylight Sensing)
- a. Photocell sensing devices must be configurable to control a local zone.
 - b. The system must support the following type of photocell-based control:
 - 1) Continuous Dimming: The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response must be configurable to adjust the photocell setpoint and dimming rates.
5. Schedule Capabilities
- a. System must support the creation of time schedules for time-of-day override of devices including offsets from dusk and dawn.



- b. System must support blink warning and timed extension capabilities. At the end of a scheduled period, the system must be capable of providing a visible “blink warning” 5 minutes prior to the end of the schedule. Wall stations may be programmed to provide timed overrides that turn the lights on for an additional period of time. Timed override duration must be programmable for each individual device, zone of devices, or customized group of devices, ranging from 5 minutes to 12 hours.
- 6. Global Profile Capabilities
 - a. The system must be capable of automatically modifying the sequence of operation for selected devices in response to any of the following: a time-of-day schedule, contact closure input state, manually triggered wired wall station input, RS-232/RS-485 command to wired input device, and BACnet input command. This capability is defined as supporting “Global Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage.
 - b. Global profiles may be scheduled with the following capabilities:
 - 1) Global Profiles must be stored within and executed from the system controller (via internal timeclock) such that a dedicated software host or server is not required to be online to support automatic scheduling and/or operation of Global Profiles.
 - 2) Global Profile time-of-day schedules must be capable of being given the following recurrence settings: daily, specific days of week, every “n” number of days, weekly, monthly, and yearly. Lighting control profile schedules must support definition of start date, end date, end after “n” recurrences, or never ending. Daylight savings time adjustments must be capable of being performed automatically, if desired.
 - 3) Global Profile Holiday Schedules should follow recurrent settings for specific US holiday dates regardless if they always occur on a specific date or are determined by the day/week of the month.
 - 4) Global Profiles must be capable of being scheduled to run according to timed offsets relative to sunrise or sunset. Sunrise/sunset times must be automatically derived from location information using an astronomical clock.
 - 5) Software management interface must be capable of displaying a graphic calendar view of profile schedules for each control zone.
 - c. System Global Profiles must have the following additional capabilities:
 - 1) Global Profiles must be capable of being manually activated directly from the system controller, specially programmed wired input devices, scene capable wired wall stations, and the software management interface.
 - 2) Global Profiles must be selectable to apply to a single device, zone of devices, or customized group of devices.
 - 3) Parameters that must be configurable and assigned to a Global Profile must include, but not be limited to, fixture light level, occupancy time delay, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wall stations.
 - d. A backup of Local and Global Profiles must be stored on the software’s host server such that the Profile backup can be applied to a replacement system controller or wired wall station.
- 7. System must support automated demand response capabilities with automatic reduction of light level to at least three levels of demand response.



2.4 SYSTEM SOFTWARE INTERFACES

A. Management Interface

1. System must provide a web-based management interface that provides remote system control, live status monitoring, and configuration capabilities of lighting control settings and schedules.
2. Management interface must be compatible with industry-standard web browser clients, including, but not limited to, Microsoft Internet Explorer, Apple Safari, Google Chrome, Mozilla Firefox.
3. Management interface must require all users to login with a User Name and Password, and must support creation of at least 100 unique user accounts.
4. Management interface must support at least three permission levels for users: read-only, read & change settings, and full administrative system access.
5. Management interface must be capable of restricting access for user accounts to specific devices within the system.
6. All system devices must be capable of being given user-defined names.
7. The following device identification information must be displayed in the Management interface: model number, model description, serial number or network ID, manufacturing date code, custom label(s), and parent network device.
8. Management interface must be able to read the live status of a networked luminaire or intelligent control device and must be capable of displaying luminaire on/off status, dim level, power measurement, device temperature, PIR occupancy sensor status, microphonic occupancy sensor status, remaining occupancy time delay, photocell reading, and active Profiles.
9. Management interface must be able to read the current active settings of a networked luminaire or intelligent control device and must be capable of displaying dimming trim levels, occupancy sensor and photocell enable/disable, occupancy sensor time delay and light level settings, occupancy sensor response (normal or vacancy), and photocell setpoints and transition time delays.
10. Management interface must be able to change the current active settings and default settings for an individual networked luminaire or intelligent control device.
11. Management interface must be capable of applying settings changes for a zone of devices or a group of selected devices using a single “save” action that does not require the user to save settings changes for each individual device.
12. A printable network inventory report must be available via the management interface.
13. printable report detailing all system profiles must be available via the management interface.
14. All sensitive information stored by the software must be encrypted.
15. All system software updates must be available for automatic download and installation via the internet.

B. Visualization and Programming Interfaces

1. System must provide an optional web-based visualization interface that displays graphical floorplan.
2. Graphical floorplan must offer the following types of system visualization:



- a. Full Device Option - A master graphic of the entire building, by floor, showing each control device installed in the project with zones outlined. This must include, but not be limited to, the following:
 - 1) Controls embedded light fixtures
 - 2) Controls devices not embedded in light fixtures
 - 3) Daylight Sensors
 - 4) Occupancy Sensors
 - 5) Wall Switches and Dimmers
 - 6) Scene Controllers
 - 7) Networked Relays
 - 8) Wired Bridges
 - 9) System Controllers
 - 10) Wired Relay Panels
 - 11) Group outlines
- b. Group Only Option - A master graphic of the entire building, by floor, showing only control groups outlined.
- c. Allow for pan and zoom commands so smaller areas can be displayed on a larger scale simply by panning and zooming each floor's master graphic.
- d. A mouse click on any control device must display the following information (as applicable):
 - 1) The device catalog number.
 - 2) The device name and custom label.
 - 3) Device diagnostic information.
 - 4) Information about the device status or current configuration is available with an additional mouse click.

2.5 SYSTEM BACKBONE AND SYSTEM INTEGRATION EQUIPMENT

A. System Controller

1. System Controller must be multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
2. System Controller must have 32-bit microprocessor operating at a minimum of 1 GHz.
3. System Controller must have minimum of 512MB memory, with a minimum of 4GB non-volatile flash, to support its own operating system and databases.
4. System Controller must perform the following functions:
 - a. Time-based control of downstream wired and wireless network devices.
 - b. Linking into an Ethernet network.
 - c. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
 - d. Connection to various software interfaces, including management interface, historical database and analytics interface, and visualization interface.
5. System Controller must have an integral web server to support configuration, diagnostics and hosting of software interfaces.
6. Device must have option for a graphical touch screen to support configuration and diagnostics.
7. Device must have three RJ-45 networked lighting control ports for connection to any of the following:



- a. The graphical touch screen
 - b. Wired communication bridges
 - c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port)
8. Device must automatically detect all networked devices connected to it.
 9. Device must have an internal time clock used for astronomical and standard schedules.
 10. Device must have 2 switched RJ-45 10/100 BaseT Ethernet ports for local area network (LAN) connection.
 - a. Ethernet connection must support daisy chain wiring to other lighting control system LAN devices.
 - b. Ethernet connection must support IPv4 and must be capable of using a dedicated static or DHCP assigned IP address.
 11. Device must have 2 x USB 2.0 Expansion ports for 802.11 Wi-Fi Adapter enabling wireless connectivity including:
 - a. Hot Spot
 - b. Access Point
 - c. Client
 12. Each System Controller must be capable of managing and operating at least 750 networked devices.
 - a. Multiple System Controllers may be networked together via LAN connection to scale the system up to 20,000 networked devices.
 13. System Controller must support BACnet/IP and BACnet MS/TP protocols to directly interface with BMS and HVAC equipment without the need for additional protocol translation gateways.
 - a. BACnet MS/TP must support 9600 to 115200 baud rate.
 - b. System Controller must be BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
 14. System controller must contain a “FIPS 140-2 Level 1 Inside” cryptographic module.
 15. System controller must support RESTful API control of BACnet objects, user management, date and time, and file management.
 16. System controller must be available within a NEMA 1 enclosure with Class 1 and Class 2 separation
 - a. Enclosure must support power input power of 120-277VAC, or optional 347.
- B. Digital Electronic Time Clock (DTC)**
1. DTC must control and program a linear bus of lighting devices and supply all time functions without connection to a system controller.
 - a. Programming of the linear bus of lighting devices must not require additional hardware, including computers, specialized dongles, or other connection devices.
 2. Programming of the linear bus must be exclusively done through the touch screen interface.
 - a. DTC must be capable of up to 32 schedules. Each schedule must consist of one set of On and Off times per day for each day of the week and for each of two holiday lists. The schedules must apply to any individual relay or group of relays.
 - b. DTC must be run from non-volatile memory so that all system programming is retained indefinitely.



- c. DTC must be optionally mounted inside of a relay panel. Installation inside of the relay panel must eliminate the necessity of any additional enclosures for complete installation.
- d. DTC must have a capacitive 3.5” full color touch screen.

2.6 WIRED NETWORKED DEVICES

A. Wired Networked Wall Switches, Dimmers, Scene Controllers

1. Devices must recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power must be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All switches must have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical push-buttons must provide tactile and LED user feedback.
5. Devices with mechanical push-buttons must be made available with custom button labeling.
6. Wall switches & dimmers must support the following device options:
 - a. Number of control zones: 1, 2 or 4
 - b. Control Types Supported:
 - 1) On/Off
 - 2) On/Off/Dimming
 - 3) On/Off/Dimming/Correlated Color Temperature Control for specific luminaire types
 - c. Colors: Ivory, White, Light Almond, Gray, Black, Red
7. Scene controllers must support the following device options:
 - a. Number of scenes: 1, 2 or 4
 - b. Control Types Supported:
 - 1) On/Off
 - 2) On/Off/Dimming
 - 3) Preset Level Scene Type
 - 4) On/Off/Dimming/Preset Level for Correlated Color Temperature
 - 5) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene. This must support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
 - 6) Selecting a lighting profile to be run by the system’s upstream controller so as to implement a selected lighting profile across multiple zones. This must support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
 - c. Colors: Ivory, White, Light Almond, Gray, Black, Red

B. Wired Networked Graphic Wall Stations

1. Device must surface mount to single-gang switch box.
2. Device must have a 3.5”, capacitive full color touch screen.
3. Device must be powered with Class 2 low voltage supplied locally via a directly wired power supply.



4. Device must have a micro-USB style connector for local computer connectivity.
5. Device must enable mobile application control of control zones and scenes. Communication must be over standard low voltage network cabling with RJ-45 connectors.
6. Device must enable user supplied screen saver image to be uploaded within one of the following formats: jpg, png, gif, bmp, tif.
7. Device must enable configuration of all switches, dimmers, control zones, and lighting preset scenes via password protected setup screens.
8. Graphic wall stations must support the following device options:
 - a. Number of control zones: Up to 16
 - b. Number of scenes: Up to 16
 - c. Profile type scene duration: User configurable from 5 minutes to 12 hours
 - d. Colors: White, Black

C. Wired Networked Digital Key Switches

1. Devices must recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power must be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All switches must have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices must have LED user feedback to provide indication of on/off status of the programmed lights or scene, as well as indication of device power.
5. Digital key switches must support the following device options:
 - a. Control Types Supported:
 - 1) On/Off
 - 2) On/Off/Dimming
 - 3) Preset Level Scene Type
 - 4) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene. This must support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
 - 5) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones. This must support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
 - b. Colors: Ivory, White, Light Almond, Stainless Steel

D. Wired Networked Auxiliary Input / Output (I/O) Devices

1. Devices must be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a ½" knockout.
2. Communication and low voltage power must be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. Auxiliary Input/Output Devices must be specified as an input or output device with the following options:
 - a. Contact closure or Pull High input



- 1) Input must be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, activate lights at a preconfigured level, ramp light level up or down, or toggle lights on/off.
 - b. 0-10V analog input
 - 1) Input must be programmable to function as a daylight sensor.
 - c. RS-232/RS-485 digital input
 - 1) Input supports activation of up to 4 local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
 - d. 0-10V dimming control output, capable of sinking up to 20mA of current
 - 1) Output must be programmable to support all standard sequence of operations supported by system.
 - e. Digital control output via LED code communication
 - 1) Output must be programmable to support light intensity control, as well as optional correlated color temperature (CCT) control, of the connected luminaire.
- E. Wired Networked Occupancy and Photosensors
1. Occupancy sensors must sense the presence of human activity within the desired space and fully control the on/off function of the lights.
 2. Sensors must utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies must not be accepted.
 3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology must be used.
 4. Dual technology sensors must have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) must not be acceptable.
 5. All sensing technologies must be acoustically passive, meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies must not be accepted.
 6. System must have ceiling, fixture, recessed & corner mounted sensors available, with multiple lens options available customized for specific applications.
 7. Communication and low voltage power must be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
 8. All sensors must have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
 9. Sensor programming parameter must be available and configurable remotely from the software and locally via the device push-button.
 10. Ceiling mount occupancy sensors must be available with zero or one integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).



11. Sensors must be available with one or two occupancy “poles”, each of which provides a programmable time delay.
 12. Sensors must have optional features for photosensor/daylight override, automatic dimming control, and low temperature/high humidity operation.
 13. Photosensor must provide for an on/off set-point, and a dead band to prevent the artificial light from cycling. Delay must be incorporated into the photocell to prevent rapid response to passing clouds.
 14. Photosensor and dimming sensor’s set-point and dead band must be automatically calibrated through the sensor’s microprocessor by initiating an “Automatic Set-point Programming” procedure. Min and max dim settings as well as set-point may be manually entered.
 15. Dead band setting must be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
 16. A dual zone option must be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The secondary daylight zone must be capable of being controlled as an “offset” from the primary zone.
- F. Wired Networked Wall Switch Sensors
1. Product Series: nWSX LV
 2. Devices must recess into single-gang switch box and fit a standard GFI opening.
 3. Communication and low voltage power must be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
 4. All wall switch sensors must have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
 5. Devices with mechanical push-buttons must provide tactile user feedback.
 6. Wall switches sensors must support the following device options:
 - a. User Input Control Types Supported: On/Off or On/Off/Dimming
 - b. Occupancy Sensing Technology: PIR only or Dual Tech acoustic
 - c. Daylight Sensing Option: Inhibit Photosensor
 - d. Colors: Ivory, White, Light Almond, Gray, Black, Red
- G. Wired Networked Embedded Sensors
1. Network system must have embedded sensors consisting of occupancy sensors and/or dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
 2. Occupancy sensor detection pattern must be suitable for 7.5’ to 20’ mounting heights.
 3. Embedded sensors must support the following device options:
 - a. Occupancy Sensing technology: PIR only or Dual Tech acoustic
 - b. Daylight Sensing Option: Occupancy only, Daylight only, or combination Occupancy/Daylight sensor
- H. Wired Networked Power Packs and Secondary Packs
1. Power Packs must incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.



2. Power Packs must accept 120 or 277 VAC (or optionally 347 VAC) and carry a plenum rating.
3. Secondary Packs must incorporate the relay and 0-10 VDC or line voltage dimming output, but must not be required to contribute system power.
4. Power Supplies must provide system power only, but are not required to switch line voltage circuit.
5. Auxiliary Relay Packs must switch low voltage circuits only, capable of switching 1 amp at 40 VAC/VDC (resistive only).
6. Communication must be delivered to each device via standard low voltage network cabling with RJ-45 connectors. Secondary packs must receive low voltage power via standard low voltage network cable.
7. Power Pack programming parameters must be available and configurable remotely from the software and locally via the device push-button.
8. Power Pack must securely mount through a threaded ½ inch chase nipple or be capable of being secured within a luminaire ballast/driver channel. Plastic clips into junction box must not be accepted. All Class 1 wiring must pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
9. Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
10. Power/Secondary Packs must be available with the following options:
 - a. Power Pack capable of full 16-Amp switching of all normal power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current.
 - b. Secondary Pack with UL924 listing for switching of full 16-Amp Emergency Power circuits, with optional 0-10V dimming output capable of up to 100mA of sink current.
 - c. Power and Secondary Packs capable of full 20-Amp switching of general purpose receptacle (plug-load) control.
 - d. Secondary Pack capable of full 16-Amp switching of all normal power lighting load types.
 - e. Secondary Pack capable of 5-Amps switching and dimming 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
 - f. Secondary Pack capable of 5-Amps switching and dimming of 120/277 VAC magnetic low voltage transformers.
 - g. Secondary Pack capable of 4-Amps switching and dimming of 120 VAC electronic low voltage transformers.
 - h. Secondary Pack capable of louver/damper motor control for skylights.
 - i. Secondary Pack capable of providing a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
 - j. Secondary Pack capable of switching 1 amp at 40 VAC/VDC (resistive only) with the intent to provide relay signal to auxiliary system (e.g. BMS).
 - k. Power Supply capable of providing auxiliary bus power (no switched or dimmed load).



I. Wired Networked Luminaires

1. Product Series: Networked Luminaires must be factory enabled with embedded networking capability:
 - a. Networked luminaire must have a mechanically integrated control device.
2. Networked LED luminaire must have two RJ-45 ports available (via control device directly or incorporated RJ-45 splitter).
3. Networked LED luminaire must be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).
4. Networked LED luminaire must provide low voltage power to other networked control devices (excluding EMG and CCT capable versions).
5. System must be able to turn on/off specific LED luminaires without using a relay, if LED driver supports "sleep mode."
6. System must be able to maintain constant lumen output over the specified life of the LED luminaire (also called lumen compensation) by automatically varying the dimming control signal to account for lumen depreciation.
 - a. System must indicate (via a blink warning) when the LED luminaire is no longer able to compensate for lumen depreciation.
7. System must be able to provide control of network luminaire intensity, in addition to correlated color temperature of specific LED luminaires.
8. System must be able to provide control of network luminaire intensity, in addition to dynamic features, such as grayscale and color accent of specific LED luminaires.

J. Wired Networked Relay and Dimming Panel

1. Relay and dimming panel must be available with 4, 8, 12, 16, 24, 32, 40 or 48 individual relays per panel, with an equal number of individual 0-10V dimming outputs.
2. Optional Field Configurable Relays (FCR) used must have the following required properties:
 - a. Configurable in the field to operate with single-, double-, or triple-pole relay groupings.
 - b. Configurable in the field to operate with normally closed or normally open behavior.
 - c. Provides visual status of current state and manual override control of each relay.
 - d. Listed for the following minimum ratings:
 - 1) 40A @ 120-480VAC Ballast
 - 2) 16A @ 120-277VAC Electronic
 - 3) 20A @ 120-277VAC Tungsten
 - 4) 20A @ 48VDC Resistive
 - 5) 2HP @ 120VAC
 - 6) 3HP @ 240-277VAC
 - 7) 65kA SCCR @ 480VAC
3. 0-10 dimming outputs must support a minimum of 100mA sink current per output.
4. Relay and dimming outputs must be individually programmable to support all standard sequence of operations as defined in this specification.
5. Panel must be UL924 listed for control of emergency lighting circuits.
6. Panel must power itself from an integrated 120-277 VAC or optional 347VAC supply.
7. Panel must provide a configurable low-voltage sensor input with the following properties:



- a. Configurable to support any of the following input types:
 - 1) Indoor Photocell
 - 2) Outdoor Photocell
 - 3) Occupancy Sensor
 - 4) Contact Closure
 - b. Low voltage sensor input must provide +24VDC power for the sensor so that additional auxiliary power supplies are not required.
 - c. Sensor input supports all standard sequence of operations as defined in this specification.
8. Panel must provide a contact closure input for each group of 8-relays that acts as a panel override to activate the normally configured state of all relays (i.e., normally open or normally closed) in the panel. This input is intended to provide an interface to alarm systems, fire panels, or BMS system to override the panel.
 9. Panel must supply current limited low voltage power to other networked devices connected via low voltage network cable.
 10. Panel must be available with NEMA 1 rated enclosure with the following mounting and cover options:
 - a. Surface-mounted for all panel sizes
 - b. Flush-mounted for up to 16 relay panel sizes
 - c. Screw-fastened for up to 16 relay panel sizes
 - d. Hinged cover with keyed lock for all panel sizes
 11. Surface-mounted screw cover options for 8 and 16 relay panel sizes must be plenum rated
 12. Panel must be rated from 0-50C for 8 and 16 enclosure sizes, and 0-45C for 32 and 48 enclosure sizes.
- K. Wired Networked Bluetooth Low Energy Programming Device
1. Device must be plenum rated and be inline wired, screw mountable.
 2. Communication and low voltage power must be delivered to device via standard low voltage network cabling with RJ-45 connectors.
 3. Bluetooth Low Energy connection must allow connection from smartphone application for programming device settings within the local daisy-chain zone
 - a. Device must provide visual indication of remote Bluetooth connection via LED integrated into device enclosure such that it is visible from all angles while the zone is being programmed.
- L. Wired Networked Communication Bridge
1. Device must surface mount to a standard 4" x 4" square junction box.
 2. Device must have 8 RJ-45 ports for connection to lighting control zones (up to 128 devices per port), additional network bridges, and System Controller.
 3. Device must be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to System Controller.
 4. Device must be powered with Class 2 low voltage supplied locally via a directly wired power supply, or powered via low voltage network connections from powered lighting control devices (e.g. power packs).



5. Wired Bridge must be capable of redistributing power from its local supply and connected lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of power to a particular area to be less impactful on network lighting control system.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION REQUIREMENTS

- A. Installation Procedures and Verification
 1. Review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
 2. Install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.
 3. Contractor is responsible for testing of all low voltage network cable. Contractor is responsible for verification of the following minimum parameters:
 - a. Wire Map (continuity, pin termination, shorts and open connections, etc.)
 - b. Length
 - c. Insertion Loss
- B. Coordination with City of New York's IT Network Infrastructure
 1. Coordinate with the commissioner to secure all required network connections to the City of New York's IT network infrastructure.
 - a. Provide to the commissioner all network infrastructure requirements of the networked lighting control system.
 - b. Provide to the manufacturer's representative all necessary contacts pertaining to the City of New York's IT infrastructure, to ensure that the system is properly connected and started up.
- C. Documentation and Deliverables
 1. Contractor is responsible for documenting installed location of all networked devices, including networked luminaires. This includes responsibility to provide as-built plan drawing showing device address barcodes corresponding to locations of installed equipment.
 2. Contractor is also responsible for the following additional documentation to the manufacturer's representative.
 - a. As-Built floor plan drawings showing device address locations required above. All documentation must remain legible when reproducing/scanning drawing files for electronic submission.
 - b. As-Built electrical lighting drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans must be based on as-built conditions.



- 1) CAD files must have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:
 - Titleblock
 - Text- Inclusive of room names and numbers, fixture tags and drawings notes
 - Fixture wiring and homeruns
 - Control devices
 - Hatching or poché of light fixtures or architectural elements
- 2) CAD files must be of AutoCAD 2013 or earlier. Revit file overall floor plan views must be exported to AutoCAD 2013.

3.3 SYSTEM STARTUP

- A. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system must be started up and programmed.
 1. For CAT5 wired devices, low voltage network cable testing must be performed prior to system startup.
- B. System start-up and programming must include:
 1. Verifying operational communication to all system devices.
 2. Programming the network devices into functional control zones to meet the required sequence of operation.
 3. Programming and verifying all sequence of operations.
- C. Initial start-up and programming is to occur on-site.

3.4 PROJECT TURNOVER

- A. System Documentation
 1. Submit software database file with desired device labels and notes completed. Changes to this file will not be made by the factory.
 2. Grant access to the commissioner for the programming database, if requested.
- B. City of New York Instruction
 1. Provisions for onsite instruction for the City of New York's designated attendees to be included in submittal package.

END OF SECTION 26 09 23

SECTION 26 12 00

MEDIUM-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: distribution and power transformers with medium-voltage primaries.
- B. Related Sections include the following:
1. Division 26 Section 26 05 13 "Medium-Voltage Cables" for cable terminations at transformers.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Include data on features, components, ratings, and performance for each type of transformer specified. Include dimensioned plans, sections, and elevation views. Show minimum clearances and installed devices and features.
- C. Wiring Diagrams: Detail wiring and identify terminals for tap changing and connecting field-installed wiring.
- D. Product Certificates: Signed by manufacturers of transformers certifying that the products furnished comply with requirements.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- F. Factory Test Reports: Certified copies of manufacturer's design and routine factory tests required by referenced standards.
- G. Sound-Level Test Reports: Certified copies of manufacturer's sound-level tests applicable to equipment for this Project.
- H. Field Test Reports: Indicate and interpret test results for tests specified in Part 3.
- I. Maintenance Data: For transformers to include in the maintenance manuals specified in DDC General Conditions.
- J. Submit short circuit, arc flash and overcurrent protection coordination study as described in



Section 26 05 00 “Common Work Results for Electrical”. Study must accompany equipment submittals. Failure to include the study with the equipment submittals will cause the equipment submittals to be rejected.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Testing Agency Qualifications: In addition to requirements specified in DDC General Conditions Section "Quality Control," an independent testing agency must meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907; or must be a full-member company of the InterNational Electrical Testing Association.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.
- C. Listing and Labeling: Provide transformers specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- D. Comply with IEEE C2.
- E. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: For indoor, dry-type transformers, apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit throughout periods during which equipment is not energized and is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB Power T & D Co., Inc.
 - 2. Acme Electric Corp.; Transformer Division.
 - 3. Cooper Industries; Cooper Power Systems Division.
 - 4. Federal Pacific Co.; Line Power Mfg. Corp. Subsidiary.
 - 5. GEC Alsthom T&D Balteau.
 - 6. GE Electrical Distribution & Control.



7. Hammond Co.; Matra Electric, Inc.
8. MagneTek Inc.
9. Magnetic Windings Hi-Tek, Inc.
10. Neeltran, Inc.
11. Pauwels Transformers, Inc.
12. Siemens Industry Inc.
13. Sola/Hevi-Duty Electric.
14. Square D; Groupe Schneider.
15. Uptegraff: R.E. Uptegraff Mfg. Co.
16. Virginia Transformer Corp.
17. Or approved equal.

2.2 TRANSFORMERS, GENERAL

- A. Description: 2-winding type, designed for operation with high-voltage windings connected to a 3-phase, 3-wire, 60-Hz, grounded-neutral distribution system.
- B. Low-Sound-Level Units: Minimum of 3 dB less than NEMA TR 1 standard sound levels for transformer type and rating.
- C. Unusual Service Conditions: Provide transformers designed for the following conditions:
- D. Forced-Air Cooling Provisions: Cooling fans, temperature-sensing devices, and controls; complete with housings, mounting devices, conduit, and wiring.
 1. Cooling-Fan Operation: Automatically and sequentially controlled by temperature-sensing devices.
 2. Manually Operable Switch: Connected in parallel with automatic-control contacts.
 3. Enclosure for Controls: Cabinets mounted on side of transformer at a height not more than 60 inches (1500 mm) above base.
 4. Cooling Fans: Propeller type, with aluminum blades and direct-drive, totally enclosed, fan-cooled motors.
 5. Motor Circuits: Individually fused or thermally protected.
 6. Fans: OSHA blade guards.
 7. Fan Control: Thermally operated, windings' temperature-sensing devices.
- E. Future Forced-Air Cooling Control: Include the following:
 1. Top-Liquid Temperature Sensing on Liquid-Filled Transformers: Thermally operated temperature-control device with a thermal element mounted in a well; and provisions for mounting the control cabinet, conduit, and fans.
 2. Windings' Temperature Sensing on Liquid-Filled Transformers: Thermally operated



windings' temperature-control device with a thermal element mounted in a well; heating coil; and provisions for mounting the control cabinet, conduit, and fans.

3. Windings' Temperature Sensing on Dry-Type Transformers: Insulated wells in all 3 coils for future installation of sensors directly in air ducts of each coil to monitor coil temperature; and provisions for mounting control cabinet, conduit, and fans.

2.3 DRY-TYPE TRANSFORMERS

- A. Comply with NEMA ST 20, IEEE C.57.12.01, and IEEE C57.94, and list and label as complying with UL 1562.
- B. Enclosure: Outdoor, ventilated, raintight, NEMA 250, Type 3R.
- C. Cooling System: Comply with IEEE C57.12.01 class indication in the Medium-Voltage Transformer Schedule.
- D. Windings: Copper.
- E. Insulation Class: 220 deg C.
 1. Rated Temperature Rise: 115 deg C maximum rise above 40 deg C.
 2. BIL: Standard value for nominal primary equipment voltage per applicable IEEE standard.
- F. Full-Capacity Voltage Taps: Four 2.5-percent taps; 2 above and 2 below rated high voltage.
- G. Impedance: Value indicated in schedule or, if none indicated, manufacturer's standard.
- H. Include the following accessories:
 1. High-Voltage Surge Arresters: Distribution class, low-flashover, metal-oxide-varistor type complying with NEMA LA 1; factory installed and connected to high-voltage terminals.
 2. Low-Voltage Surge Arresters: Metal-oxide-varistor type complying with NEMA LA 1; factory installed and connected to low-voltage terminals.
 3. High-Voltage Terminal Compartment: Steel compartment with height to match transformer.
 4. Low-Voltage Terminal Compartment: Steel compartment with height to match transformer.
 5. High-Temperature Alarm: A sensor at the transformer with local audible and visual alarm and contacts for remote alarm.

2.4 LIQUID-FILLED/PAD-MOUNTED TRANSFORMERS

- A. Description: Comply with IEEE C57.12.22 and ANSI C57.12.28.



- B. Insulating Liquid: Silicone, listed as less-flammable type. Liquid can extinguish small arcing and has a minimum fire point of 330 deg C, a minimum thermal conductivity of 0.00036 Cal/(Sec x sq. cm x deg C) at 25 deg C, and a minimum dielectric strength of 33 kV, when tested per ASTM D 877.
 - 1. Rated Temperature Rise: 65 deg C maximum rise above 40 deg C.
 - 2. BIL: Standard value for nominal primary equipment voltage per applicable IEEE standard.
- C. Full-Capacity Voltage Taps: Four 2.5-percent taps; 2 above and 2 below rated high voltage; with externally operable tap changer for de-energized use and with a position indicator and padlock hasp.
- D. High-Voltage Switching: Arranged for loop feed with 3-phase, 4-position, gang-operated load-break switch that is oil immersed in transformer tank with hook-stick operating handle in primary compartment.
- E. Primary Fuse: Current-limiting type in dry-fuse holder wells, mechanically interlocked with a liquid-immersed switch in the transformer tank to prevent disconnect under load.
- F. Surge Arresters: Distribution class, one for each primary phase. Comply with NEMA LA 1. Support from tank wall within high-voltage compartment.
- G. High-Voltage Terminations and Equipment: Dead front with universal-type bushing wells for dead-front bushing-well inserts. Include the following:
 - 1. Bushing-Well Inserts: One for each high-voltage bushing well.
 - 2. Surge Arresters: Dead-front, elbow-type, metal-oxide-varistor units.
 - 3. Parking Stands: One for each high-voltage bushing well.
 - 4. Portable Insulated Bushings: Arranged for parking insulated, high-voltage, load-break cable terminators; one for each primary feeder conductor terminating at transformer.
- H. Include the following accessories:
 - 1. Drain Valve: 1 inch (25 mm), with sampling device.
 - 2. Dial-type thermometer.
 - 3. Liquid-level gage.
 - 4. Pressure-vacuum gage.
 - 5. Pressure-Relief Device: Self-sealing with an indicator.
 - 6. Mounting provisions for low-voltage current transformers.
 - 7. Mounting provisions for low-voltage potential transformers.

8. Busway terminal connection at low-voltage compartment.
9. Alarm contacts for above gages and thermometer.

2.5 FINISHES

- A. Enclosure Coating System for Outdoor Units: Comply with ANSI C57.12.28 regardless of transformer type.

2.6 SOURCE QUALITY CONTROL

- A. Factory Tests: Design and routine tests comply with referenced standards.
- B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project if specified sound levels are below standard ratings.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Comply with IEEE C2.
- B. Identify transformers and install warning signs according to Division 26 Section 26 05 53 "Identification for Electrical Work."
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 GROUNDING

- A. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping as indicated to comply with NFPA 70.
- B. Comply with Division 26 Section 26 05 26 "Grounding and Bonding for Electrical Systems" for materials and installation requirements.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to supervise the field assembly and connection of components, and the testing and adjusting of transformer components and accessories.
- B. Independent Testing Agency: Engage an independent electrical testing agency to test medium-voltage transformer installations as specified below.



- C. Test Objectives: To ensure transformer is operational within industry and manufacturer's tolerances, is installed according to the Contract Documents, and is suitable for energizing.
- D. Test Labeling: On satisfactory completion of tests for each transformer, attach a dated and signed "Satisfactory Test" label to tested component.
- E. Schedule tests and provide notification at least 7 days in advance of test commencement.
- F. Report: Submit a written report of observations and tests. Report defective materials and installation.
- G. Tests: Include the following minimum inspections and tests according to manufacturer's written instructions. Comply with IEEE C57.12.90 for test methods and data correction factors for liquid-filled units and with IEEE C57.12.91 for dry-type units.
 - 1. Inspect accessible components for cleanliness, mechanical and electrical integrity, and damage or deterioration. Verify that temporary shipping bracing has been removed. Include internal inspection through access panels and covers for dry-type transformers.
 - 2. Inspect bolted electrical connections for tightness according to manufacturer's published torque values or, if not available, those specified in UL 486A and UL 486B.
 - 3. Insulation Resistance: Perform megohmmeter tests of primary and secondary winding to winding and winding to ground.
 - a. For Windings' Ratings from 0 to 600 V: 1000-V, dc minimum test voltage; and 500 megohms for dry-type and 100 megohms for liquid-filled transformers.
 - b. For Windings' Ratings from 601 to 5000 V: 2500-V, dc minimum test voltage; and 5000 megohms for dry-type and 1000 megohms for liquid-filled transformers.
 - c. For Windings' Ratings from 5000 to 35,000 V: 5000-V, dc minimum test voltage; and 25,000 megohms for dry-type and 5000 megohms for liquid-filled transformers.
 - 4. Duration of Each Test: 10 minutes.
 - 5. Temperature Correction: Correct results for test temperature deviation from 20 deg C standard.
 - 6. Turns Ratio: Measure between windings at each tap setting. Measured ratios deviating more than 0.5 percent from calculated or measured ratio for an adjacent coil are not acceptable.
 - 7. Winding Resistance: Measure for windings at nominal tap setting. Measured resistance deviating more than 1 percent from that of adjacent windings is not acceptable.
 - 8. Overpotential Tests: Apply between high and low voltage and ground at not more than 85 percent of factory-test value for 1 minute.



9. Liquid-Filled Transformer, Insulation Power-Factor Test: Determine overall dielectric loss and power factor for windings' insulation. Limit test voltage to line-to-ground voltage of windings being tested. Measured values exceeding the following are not acceptable:
 - a. Oil-Filled Units: 1 percent.
 - b. Silicone-Filled Units: 0.5 percent.
 - c. High-Fire-Point, Hydrocarbon-Filled Units: 1 percent.
- H. Test Failures: Compare test results with specified performance or manufacturer's data. Correct deficiencies identified by tests and retest. Verify that transformers meet specified requirements.
- I. Infrared Scanning: After Substantial Completion, but not more than two months after Final Acceptance, perform an infrared scan of switchboard assembly. Make bus joints and connections accessible to a portable scanner and perform scanning during a period of normal working load as advised by the Commissioner.
 1. Follow-up Infrared Scanning: Perform one additional follow-up infrared scan at same locations as before, 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or detect significant deviations from normal values. Provide calibration record for scanning device used for electrical distribution equipment.
 3. Record of Infrared Scanning: Prepare a certified report identifying all connections checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 CLEANING

- A. On completion of installation, inspect components. Remove paint splatters and other spots, dirt, and debris. Restore scratches and marks on finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.6 ADJUSTING

- A. After installing and cleaning, touch up scratches and mars on finish to match original finish.
- B. Adjust transformer taps to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility. Record primary and secondary voltages and tap settings and submit with test results.
- C. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in readjusting transformer tap settings to suit actual occupied conditions. Provide up to 2 visits to Project Site for this purpose without additional cost.
 1. Voltage Recordings: Contractor performed. Provide up to 48 hours of recording on the low-voltage system of each medium-voltage transformer.



2. Point of Measurement: Make voltage recordings at load outlets selected by the Commissioner.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to explain transformers and accessories and to instruct The City of New York maintenance personnel. Include a minimum of 8 hours of instruction in operation and maintenance. Provide both classroom instructing and hands-on equipment operation covering the following:
 1. Safety precautions.
 2. Features and construction of project transformers and accessories.
 3. Routine inspection, test, and maintenance procedures.
 4. Routine cleaning.
 5. Features, operation, and maintenance of integral disconnect switches and protective devices.
 6. Interpretation of readings of indicating and alarm devices.
 7. Fuse selection.
 8. Protective-relay setting considerations.
 9. Features, operation, and maintenance of separable, insulated, connector system.
 10. Tap-changing procedures.
 11. Schedule instructing with the City of New York's staff with at least 7 days' advance notice.

END OF SECTION 26 12 00



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SECTION 26 24 16

PANELBOARDS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Lighting and appliance branch circuit panelboards.
 2. Power and distribution panelboards.

1.3 DEFINITIONS

- A. Panelette (Load Center): A panelboard with thermal magnetic molded case circuit-breaker branches, primarily of the plug-in type, designed for residential and light commercial projects, operating at 240 Volts and below, available in both single and 3-phase versions, and equipped with flush mounting trim.
- B. Overcurrent Protective Device (OCD) (OCPD): A device operative on excessive current that causes and maintains the interruption of power in the circuit it protects.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of panelboard, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- C. Shop Drawings: For each panelboard and related equipment.
1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective



devices.

- d. UL listing for series rating of installed devices.
- e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

D. Field Test Reports: Submit written test reports and include the following:

- 1. Test procedures used.
- 2. Test results that comply with requirements.
- 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing. Panelboard schedules must indicate room names/locations where the electrical devices being served are located.

F. Operation and Maintenance Data: For panelboards and components to include in maintenance manuals specified in DDC General Conditions. In addition include the following:

- 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Source Limitations: Obtain panelboards, OCD's, components and accessories through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by Underwriters Laboratories Inc.
- D. Comply with NEMA PB 1.
- E. Comply with 2014 New York City Electrical Code.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:



1. Ambient Temperature: Not exceeding 104 degrees F (40 degrees C).
 2. Altitude: Not exceeding 6600 feet (2000 m).
- B. Service Condition: NEMA PB 1, usual service conditions, as follows:
1. Ambient temperature within limits specified.
 2. Altitude not exceeding 6600 feet (2000 m).

1.7 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
1. Panelboards and Accessories:
 - a. Siemens Energy & Automation, Inc.
 - b. General Electric Co.; Electrical Distribution & Control Div.
 - c. Eaton Corp.; Cutler-Hammer Products.
 - d. Square D Co.
 - e. Or Approved Equal

2.2 MANUFACTURED UNITS

- A. Factory tests: Dielectric test, phase to phase and phase to ground, at twice the rated voltage plus 1,000 volts (1,500 volts minimum) for one minute. Date of test and the name and title of the individual certifying the test must be indicated on a label affixed to the equipment.
- B. Enclosures: Flush- and surface mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
1. Outdoor Locations: NEMA 250, Type 3R.



2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - C. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
 - E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.
 - F. Bus: Hard-drawn copper, 98 percent conductivity.
 - G. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
 - H. Main and Neutral Lugs: Type suitable for use with conductor material.
 - I. Feed-through Lugs: Type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 - J. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
 - K. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
 - L. Where wires or cables are used within panelboards to make up internal connections (factory installed or otherwise) such wire or cable must have copper conductors only.
 - M. Where indicated or as required to assure ready accessibility of top switching and overcurrent device, they must be arranged as multiple adjacent sections. A single overall cabinet must be supplied for the multiple adjacent sections which constitute one panel. 1/4 inch (7 mm) minimum thickness plastic barriers having adequate angle iron framing support all around must be included between sections. The entire assembly must be such as to include wiring gutter space for each section as if it were an individual panelboard. Common bussing must be arranged for adjacent sections unless there is indication that the individual sections are to be separately supplied. Sub-feed lugs with full capacity cable taps to adjacent panel sections will be accepted as the bussing method.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Concealed hinges, secured with flush latch with tumbler lock.



- C. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- D. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard; furnish insulated ground bus as indicated on Drawings.
- E. Minimum Integrated Short Circuit Rating: 22,000 amperes rms symmetrical for 208 volt panelboards. The final short circuit rating must be as required due to available short circuit.
- F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.
- G. Enclosure: NEMA PB 1, Type 1
- H. Cabinet Front: Flush or Surface (as indicated on drawings) cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. As described in Section 26 08 00 "Low Voltage Circuit Protective Devices".

2.5 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items as required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Switch and fuse units incorporated as part of panelboards must be equipped with factory installed rejection clips to restrict fuses to types specified in Section 26 08 13 "Fuses". Modify or replace in field any incorrect fuse clips.
- C. Provide "lock-on" clips for the toggle handles of 5 percent of the branches in all lighting and appliance panels. Apply these clips to circuits supplying emergency battery units, night lights and others as directed in the field.
- D. Furnish handle padlock attachments for 5 percent of the branches in lighting and appliance panels, and padlocks (with key) for 10 percent of these padlock attachments, but not less than 10 locks. Apply the padlock attachments to circuits (as directed in the field) for which the branch circuit device must be lockable in the "off" position in order to provide code-approved disconnect means.

2.6 PANELBOARD SHORT CIRCUIT RATINGS



- A. Panelboards must bear U.L. labels attesting to the adequacy of the equipment to withstand, and interrupt short-circuit currents not less than those available at their incoming terminals. Panels must either be fully rated or must be series rated in conjunction with integral or remote upstream devices in compliance with Section 26 08 00 "Low Voltage Circuit Protective Devices". U.L. labels must include size and type of allowable upstream and branch circuit devices and series connected ratings.
 - 1. 120/208 volt power or distribution panels must be fully rated for not less than 22,000 amps.
 - 2. 120/208 volt lighting or appliance panels must be "fully rated" for 10,000 amps except that panels supplied from transformers 225 KVA and larger must be "fully rated" or "series connected" rated for not less than 22,000 amps.
- B. Panelboard short circuit ratings must comply with the following:
 - 1. Distribution and power panels must be "fully rated" for 100,000 amps when used in conjunction with appropriate current limiting fuses as specified.
 - 2. Lighting and appliance panels must be series rated for not less than 100,000, 65,000, 42,000 22,000 amps when used in conjunction with appropriate main or upstream current limiting or high interrupting capacity circuit breakers.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Comply with mounting and anchoring requirements specified in section 26 05 29 "Hangers and Supports for Electrical Systems."
- C. Mount top of trim 74 inches above finished floor, unless otherwise indicated.
- D. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- E. Install overcurrent protective devices and controllers.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- F. Install filler plates in unused spaces.



- G. Stub four 1-inch (DN 25) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (DN 25) empty conduits into raised floor space or below slab not on grade.
- H. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 26 05 53 "Identification of Electrical Work."
- B. Create a directory to indicate installed circuit loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.4 CONNECTIONS

- A. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 26 05 19 "Low Voltage Power Conductors".

3.5 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour



services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.

3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scanning of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 2. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 CLEANING

- A. In completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Restore exposed surfaces to match original finish.

END OF SECTION 26 24 16

SECTION 26 24 20

FEEDERS AND BRANCH CIRCUITRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Basic requirements for the installation of light and power feeders and circuitry run at less than 600 volts.

1.3 RELATED SECTIONS

- A. Division 26, Section 26 05 19 "Low Voltage Electrical Power Conductor and Cables."
- B. Division 26, Section 26 05 33 "Raceways and Boxes for Electrical Systems."
- C. Division 26, Section 26 24 16 "Panelboards."

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Circuited up "as-built" drawings and panel directories as called for in the Division 26 related sections.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Comply with NFPA 70, as amended by 2014 New York City Electrical Code.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products must be as specified in the Division 26 related sections.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS



- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION OF FEEDERS

- A. Feeder connections must be in the phase rotation which establishes proper operation for all equipment supplied.
- B. Feeders consisting of multiple cables and raceways must be arranged such that each raceway of the feeder contains one cable for each phase leg (and one neutral cable if any).
- C. Each individual tap off a feeder which consists of multiple cables per phase (and neutral if any) must be arranged so that all of the cables of a phase leg (and neutral if any) of the feeder are connected to the corresponding phase leg (and neutral if any) of the individual tap.
- D. Indications of conductor sizing for three phase and three phase/four wire feeders must, unless otherwise noted on the drawings, be understood as follows:
 - 1. (3) equally sized conductors represent a three phase feeder.
 - 2. (4) equally sized conductors represent a three phase/4 wire feeder with 100% neutral.
- E. Feeders from Electric room equipment (meter centers, distribution wiring trough) in the cellar must be in rigid conduits. Refer to power riser diagram for ratings.

3.3 INSTALLATION OF LIGHTING AND APPLIANCE BRANCH CIRCUITRY

- A. Circuitry indicated without sizing must be understood to be lighting and appliance branch circuitry protected at 20 amps or less.
- B. Conform all lighting and appliance branch circuitry (regardless of whether protected above or below 20 amps) to the following:
 - 1. Except as noted below, circuitry must be multi-wire utilizing common neutrals arranged so that no neutral conductor acts as a common wire for more than one circuit conductor connected to the same phase leg of the supply system.
 - 2. Common neutrals must not be utilized for circuitry runs containing more than (6) 120 volt receptacle circuits within a single raceway (conduit).
 - 3. Branch circuitry supplying relay controlled lighting fixtures must be understood to include all necessary interconnections between the control panels containing the relays and the associated lighting or appliance panels.
 - 4. Under no condition must any local switch break a neutral conductor.



5. At any location where lighting and appliance branch circuitry is extended from a flush mounted panelboard to a suspended ceiling immediately above, at least four 1-inch empty conduits must be included (in addition to those required for active circuitry) to permit future wiring escape from the panelboard. The empty conduits must extend up from the panel and must terminate in a threaded conduit cap immediately after turning out into the hung ceiling space.
 6. Raceway sizes must conform to standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.
 7. Two and three pole branches in panels must be used respectively for individual single phase load items connected line to line and individual three phase load items. Where circuitry indications require the use of 2-pole and/or 3-pole branch breakers which have not been scheduled, provide in the panelboards the required multi-pole breakers in lieu of the equivalent number of single pole branch breakers. Required quantities of single, two and three pole branch breakers must be confirmed prior to ordering panels.
- C. Conform lighting and appliance branch circuitry, indicated as being protected at 20 amps or less, to the following:
1. 120 volt circuitry must be supplied from 20 amp panel branches except as indicated, and as noted below:
 2. Except as specified below, minimum conductor size must be #12 AWG.
 3. Common neutrals must not be utilized for circuitry runs containing more than (6) 120 volt receptacle circuits within a single raceway (conduit, cellular deck underfloor duct) except as noted below.
 4. Conductors for 120 volt circuitry extending in excess of 75 feet, from the point of supply, to the first outlet must be #10 AWG (minimum) copper to the first outlet. Increase beyond #10 AWG if required for compliance with code-mandated voltage drop restrictions.
 5. Conductors used in runs consisting of more than six wires (exclusive of grounding conductors) in a single raceway must be #10 AWG copper minimum. Increase beyond #10 AWG as required to comply with code-mandated derating factors, and as specified hereinbefore.
 6. Circuits supplying receptacles which are not of the ground fault circuit interrupting type, and are located as noted below, must be connected to panel branches that are equipped with ground fault interrupting features:
 - (a) Receptacles located in bathrooms. Bathrooms must be defined as spaces containing a basin plus a toilet, tub or shower.



- (b) Receptacles located within 6 feet of any sink and intended to serve counter top surfaces.
 - (c) All receptacles mounted on building exterior surfaces including those on balconies.
 - (d) All receptacles mounted in garages, unfinished basements and crawl spaces of private homes.
 - (e) All receptacles mounted in elevator machine rooms, machinery spaces and pits.
7. Circuits supplying pipe tracing cable, snow melting cable, gutter melting cable and HWAT cable must be connected to panel branches equipped with 30 ma interrupting features for equipment protection.

D. Where circuitry has not been delineated for lighting fixtures, receptacles, switches and miscellaneous items intended for protection at 20 amps, such items must be provided with circuitry conforming to the requirements listed below. Prior to installation of circuitry, submit for review floor plans showing circuit numbers, home runs, and interconnecting circuitry for all such items.

1. When circuiting up recessed ceiling lighting fixtures, connect fixtures on the basis of more than one fixture to a single outlet box, in an approved manner, as required to ensure that circuits will not be unnecessarily lightly loaded due to mandated, restrictions on the maximum number of outlets per circuit. Except with special permission, unnecessarily light loading must be understood to mean, less than 1000 volt amps (VA) on a 120 volt circuit and less than 3200 VA on a 277 volt circuit.
2. The total load on a circuit must be computed by ascribing volt-amps to individual items on the basis of the following:

<u>ITEM</u>	<u>VOLT-AMPS (VA)</u>
Any lighting fixture.	Input volt-amps as per lighting fixture schedule.
Any outlet with no specific wattage or circuiting instruction indicated.	180 volt amperes
Any outlet (other than for resistance heating) with wattage indicated.	1.15 x Indicated wattage
Any resistance heating outlet with wattage indicated.	1.0 x Indicated wattage



Any outlet with amps indicated.	120 x Indicated amps
---------------------------------	----------------------

3. Not more than 1300 total VA must be applied to any 15 amp, 120 volt panel branch circuit nor more than 1450 VA to any 20 amp, 120 volt branch circuit.
4. A separate 20 amp panel branch circuit supplying no other outlets must be used for each outlet indicated as an "individual appliance circuit" "heavy duty" outlet.
5. Lighting fixture must be connected to 20 amp panel branch circuits. Solidly connected equipment less than 1300 VA must be connected to 15 amp panel branch circuits except as indicated or noted herein.
6. Lighting fixtures and receptacles must not be connected to the same branch circuit except within apartments except within guest rooms.
7. Any installed lighting and appliance branch circuitry, found (as a result of unnecessarily light loading of conductors) to make excessive use of panel branches, must be rearranged.
8. Circuits must be balanced on phases at their supply point as evenly as possible.
9. The final arrangement of lighting and appliance branch circuitry must be fully delineated on the record, or "as-built" drawings called for elsewhere.

END OF SECTION 26 24 20



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SECTION 26 27 00

ELECTRIC SERVICE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: Electric Service requirements.

1.3 GENERAL REQUIREMENTS

- A. Work of this section must be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.4 REFERENCES

- A. Perform the work of this section in accordance with the requirements of Section 26 05 00 "Common Work Results for Electrical".
- B. See other Division 26 sections for requirements of electric service distribution equipment not included herein.
- C. Refer to Appendix A for Con Ed standards of medium voltage design and installation requirements. Their standards must be followed as part of the contract.

1.5 MATERIALS, EQUIPMENT AND SYSTEMS

- A. Factory wiring of components must conform to National Electrical Code with NYC amendments and UL.
- B. The criteria of design and performance to produce the required operation is based on equipment of the named manufacturers. Equipment of other manufacturers will be considered, subject to acceptability in the Commissioner's judgment and opinion. The equipment must conform to the dimensions established by the drawings for mechanical spaces and other clearances.
- C. Materials and products must be suitable for, and where applicable UL listed and labeled for, the intended use or application.



1.6 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit manufacturers' catalog data for the following service equipment:
 - 1. Meter sockets.
- C. Submit shop drawings for the following fabricated service equipment:
 - 1. CT/PT cabinets, and service end box, including bus work and mounting hardware.

1.7 UTILITY FEES

- A. Provide work, materials, and fees required and/or charged by the Electric Utility Company Con Ed relating to the establishment of electric service for the project.

1.8 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 METER SOCKETS

- A. Provide meter sockets, which comply with requirements of the Electric Utility Company Con Ed.

2.2 CT/PT CABINETS & SERVICE END BOXES

- A. Provide CT/PT cabinets, service end boxes and mounting hardware, which comply with requirements of the Electric Utility Company Con Ed. Unless otherwise indicated, CT's and PT's for revenue metering will be furnished by the Electric Utility Company Con Ed.
- B. Where so indicated, CT/PT cabinets must be an integral component of the electric service distribution equipment.
- C. Provide main circuit breaker and current transformer service entrance equipment as indicated on the drawings. Include hot or cold sequence metering, top or bottom feed, indoor or outdoor construction as shown. Manufacturers: Square D CTC Metering Equipment, Siemens BCT Service Cubicle, Eaton Cutler-Hammer, or approved equal.

2.3 MISCELLANEOUS MATERIALS

- A. Provide painted plywood backboard, conduit, wire, and any other miscellaneous materials and hardware required by the Electric Utility Company Con Ed.



PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. See Section 26 05 00 "Common Work Results for Electrical".

3.3 COORDINATION WITH ELECTRIC UTILITY COMPANY CON ED

- A. Consult with Electric Utility Company Con Ed for verification of scope of work to be performed. Perform work pertaining to the electric service in strict accordance with utility company standards and requirements. Verify service voltage, phasing, and connections. In event of conflict between design and/or scope of service, notify Commissioner in writing. Consult with Electrical Utility Company Con Ed prior to submitting electrical service requirement for approval.

3.4 INSTALLATION OF SERVICE-ENTRANCE EQUIPMENT

- A. Where applicable, receive Electric Utility Company Con Ed equipment at the property line, transport to indicated installation location, install and connect per Electric Utility Company Con Ed instructions.
- B. Identify service disconnecting means per NEC 230-70(b) and 230-77.
- C. Bond and ground service entrance equipment in accordance with NEC code with NYC amendment, Electric Utility Company Con Ed requirements, as indicated, and as specified in another Division 26 section.

3.5 FINAL INSPECTION

- A. Upon completion of installation and testing of service-entrance equipment and electrical circuitry, arrange for final inspection by the Electric Utility Company Con Ed and Electrical Inspector, energize circuitry, and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

END OF SECTION 26 27 00



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SECTION 26 27 13

ELECTRICITY METERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes:
 - 1. Provisions for the accommodation of utility company metering equipment.

1.3 RELATED SECTIONS

- A. Division 26, Section 26 05 19 "Low Voltage Power Conductor and Cables."
- B. Division 26, Section 26 05 33 "Raceways and Boxes for Electrical Systems."

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Product data for each product and component specified.
- C. Shop drawings of utility company metering provisions with indication of approval by utility company.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Listing and Labeling: Provide components that are Underwriters Laboratories listed and labeled.
 - 1. The terms "listed" and "labeled": As defined in the National Electrical Code, Article 100.
- C. Electrical Component Standard: Components and installation must comply with "2014 NYC Electrical Code", NFPA 70.

1.6 GENERAL

- A. All electricity delivered to the project will be utility company metered through various metering installations as follows:
 - 1. Electricity consumed in the interest of the New York City will be measured through a separate "house" metering installation located in the building electric room.
- B. Provide meter pan and/or backboards and current transformers cabinet and switchboard compartments as applicable for "house" metering within the building electric room.
- C. Provide "house" meter totalizing impulse wiring systems.
- D. Install current transformers furnished by the utility company.
- E. Meters will be furnished and installed by the utility company.
- F. All work for the metering installation must be provided in accordance with the utility company Con Edison's blue book "A Customer Guide to Electrical Service Installation".

PART 2 - PRODUCTS

2.1 GENERAL

- A. Furnish in accordance with the applicable requirements of Division 26 Sections 26 05 19 "Low Voltage Power Conductors and Cables" and Section 26 05 33 "Raceways, Boxes for Electrical Systems."

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

END OF SECTION 26 27 13



SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SECTION INCLUDES

- 1. Wall switches.
- 2. Wall dimmers.
- 3. Receptacles.
- 4. Device plates and decorative box covers.
- 5. Floor box service fittings.
- 6. Access floor boxes.

1.3 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 2 - Semiconductor Dimmers for Incandescent Lamps.
- C. NEMA WD 6 - Wiring Device Configurations.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Samples: Submit one sample of each type device and cover plate.
- D. Manufacturer's Instructions:
 - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.



1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

- A. Description:
1. Toggle Switches: Nema WD 1, heavy-duty, AC only general-use, quiet type snap switch with fast make-slow break, silver-cadmium oxide alloy contacts, side and back wired.
 2. Rocker Switches: Nema WD 1, AC general use only, extra quiet type rocker switch with fast make, slow break contacts , side and back wired.
- B. Device Body: White plastic with white plates, black plastic with stainless steel plates with matching switch handle.
- C. Illuminated Handle Type Switch: To match device body.
- D. Pilot Light: lighted handle type switch, red polycarbonate handle.
- E. Voltage Rating: 120-277 volts, A.C.
- F. Current Rating: 20 amperes.
- G. Manufacturers:
1. Single-pole switch: Subject to compliance with requirements, provide Lutron Nova-T NT-1PS-SN or comparable product by
 - a. Leviton or
 - b. Hubbel.
 - c. Or approved equal.
 2. Double-pole switch: Subject to compliance with requirements, provide Lutron Nova-T multi gang or comparable product by one of the following:
 - a. Leviton or
 - b. Hubbell.
 - c. Or approved equal.
 3. Three-way switch: Subject to compliance with requirements, provide Lutron Nova-T model NT-3PS-SN or comparable product by one of the following:
 - a. Leviton
 - b. Hubbell.
 - c. Or approved equal.
 4. Four-way switch: Subject to compliance with requirements, provide Lutron Nova-T model NT-4PS-SN or comparable product by one of the following:



- a. Leviton
- b. Hubbell.
- c. Or approved equal.

2.2 RECEPTACLES

- A. Description: NEMA WD1, specification grade general-use receptacle.
- B. Device Body: White plastic with white plates, black plastic with stainless steel plates.
- C. Configuration: NEMA WD6, type as specified and indicated.
- D. Convenience Receptacle: Type 5-20R.
- E. Construction:
 1. Nylon housing.
 2. Brass contacts.
 3. Solid Center rivet.
 4. Back and side wiring type.
- F. Manufacturers and Model Number:
 1. Duplex convenience receptacle: Subject to compliance with requirements, provide Lutron Nova-T model NTR-20-ST or comparable product by one of the following:
 - a. Leviton
 - b. Hubbell.
 - c. Or approved equal.
 2. GFCI receptacle: Subject to compliance with requirements, provide Lutron Nova-T model NTR-20-GFCI-ST or comparable product by one of the following:
 - a. Leviton
 - b. Hubbell.
 - c. Or approved equal
 3. Special Receptacle: Subject to compliance with requirements, type as identified by NEMA standard number on drawings, provide products by one of the following:
 - a. Lutron
 - b. Leviton
 - c. Hubbell.
 - d. Or approved equal

2.3 WALL PLATES

- A. Decorative Cover Plate: Screwless white and stainless steel (at locations as shown on the architectural drawings).
 1. Manufacturer: Subject to compliance with requirements, provide Lutron Nova-T or or comparable product by one of the following:
 - a. Leviton
 - b. Hubbell,
 - c. or approved equal.



- B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasket device cover.
 - 1. Manufacturer: Subject to compliance with requirements, products by one of the following:
 - a. Hubbell
 - b. Leviton
 - c. Arrow-Hart/Cooper
 - d. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify floor boxes are adjusted properly.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring device.
- E. Verify openings in access floor are in proper locations.

3.3 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surfaces.
- B. Clean debris from outlet boxes.

3.4 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- E. Do not share neutral conductor on load side of dimmers.
- F. Install receptacles with grounding pole on bottom or right-hand side.
- G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.



- H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- I. Connect wiring devices by wrapping conductor around screw terminal.
- J. Use jumbo size plates for outlets installed in masonry walls.
- K. Install galvanized steel plates on outlet boxes and junction boxes in unfurnished areas, above accessible ceilings, and on surface mounted outlets.
- L. Install identifying nameplate on all receptacles (including receptacles in equipment furnished by others) as per Section 26 0553.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 0533 to obtain mounting heights specified or as indicated on Drawings.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 24 inches above finished floor.
- D. Install convenience receptacle 6 inches above counter.
- E. Install dimmer 48 inches above finished floor.
- F. Install telephone jack 24 inches above finished floor.
- G. Install telephone jack for wall telephone 48 inches above finished floor.

3.6 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.7 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

END OF SECTION 26 27 26



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SECTION 26 28 00

LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Overcurrent protective devices (OCPD's) (OCD's) required for the project. It defines the type of OCPD required for each individually mounted device, panelboard, switchboard and miscellaneous device required.

1.3 RELATED SECTIONS:

- A. Division 26, Section 26 28 13 "Fuses."
- B. Division 26, Section 26 24 16 "Panelboards."

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures"
- B. Descriptive data defining how the required short circuit ratings are met by the equipment furnished under the Related Sections described above. Include UL approval data from manufacturers for "series rated" combinations.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Comply with NFPA 70, as amended by state and local codes.
- C. Listing and Labeling: Products - as described with the Related Sections above are Underwriters Laboratories listed and labeled as defined in NFPA 70 Article 100. Where "series ratings" have been specified, listings attesting to these ratings is provided from UL or other nationally recognized testing laboratory.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Refer to Related Sections listed hereinbefore for general product requirements.



- B. Short circuit current ratings, and the manufacturer's labels attesting to these ratings (based on U.L. listings), are required for overcurrent protection devices, where they are individually mounted (as fused switches or as fused switch bus duct plug-in devices), and for the equipment assemblies when they are incorporated in panels, switchboards, etc. Such ratings are in accordance with the following:
 - 1. In order to ensure that they are at least equal to the available fault current, minimum ratings have been specified herein for the individual overcurrent device types, and in the pertinent sections for panelboards, switchboards and other assemblies or devices. Where "series connected ratings" have been specified for circuit breaker type panelboards (see appropriate specification section), these minimum ratings are in general based on the use of upstream fuses which have been specifically tested with the circuit breakers and have been U.L. listed accordingly.
- C. In advance of, or in conjunction with, the submission of shop drawings for approval, provide data defining in detail how the required short circuit current ratings specified elsewhere in these specifications are achieved with the equipment being furnished under the listed Related Sections. The data will, in narrative or graphic fashion, fully define how the various devices, individually, or in combination, comply with the "fully rated" or "series connected" short circuit current requirements. Include certifications from the manufacturer as to the U.L. approvals for these ratings for all proposed equipment.

2.2 APPLICATION

- A. Overcurrent protective devices is provided in accordance with the schedule below. Abbreviations are understood to have the following meanings:

ABBREVIATION	DESCRIPTION
SW-BP	Bolted pressure switch
SW-QMQB	Quick-make, quick-break switch / Fusible (as part of switch abbreviation)
CB-SMC	Standard molded case circuit breaker.
CLCB-MC	Current limiting circuit breaker - molded case
CB-CMC	Compact molded case circuit breaker

- B. Select overcurrent protection devices as follows:

CATEGORY OF APPLICATION	DEVICE TYPE
Main or branch unit in 120/208 volt panel	CB-SMC
Main or branch unit in distribution panel or power panel	SW-QMQB/CF, except CLCB if needed for "series rating" for downstream lighting or appliance panel



CATEGORY OF APPLICATION	DEVICE TYPE
Main unit in lighting or appliance panel	CB-SMC except CLCB-MC if needed for "series rating" of panel
Branch unit in lighting or appliance panel	CB-SMC
Main unit in metering assembly	QM QB/CF
Main unit in apartment panel	CB-SMC
Tenant main unit in metering assembly	CB-SMC
Branch unit in apartment panel	CB-CMC

2.3 STANDARD MOLDED CASE CIRCUIT BREAKERS

A. Select standard, molded case type circuit breakers in accordance with the following:-

1. Their tripping units are of the "thermal magnetic" type having bimetallic elements for time delay overload protection, and magnetic elements for short circuit protection.
2. Where no frame sizes are indicated, their interrupting capacities (in RMS symmetrical amperes) are not less than the following:

3. Where Installed	Interrupting Capacity
120/208V lighting or appliance panel	22,000A

4. Where frame sizes are indicated, the interrupting capacities are no less than the following:

INDICATED FRAME SIZE	MINIMUM ACCEPTABLE SYMMETRICAL AMPERES INTERRUPTING RATING IN RMS AMPERES
100	22,000
225	22,000
400	42,000
600	65,000
800	65,000

5. The minimum interrupting capacity in symmetrical RMS amperes of the circuit breakers intended for use in panelboards are as noted above.



6. They are of the "bolted-in" type.
7. They are equipped with 5 milliamp sensitivity ground fault interrupting features where so indicated, and/or where they supply standard convenience receptacles in bathrooms, kitchens and other such code mandated locations and with 30 milliamps sensitivity G.F.I. features where they supply piping tracing cables.
8. They are equipped with arc-fault interrupting features where so indicated, and/or where they supply 120 volt, single phase, 15- and 20-ampere outlets in dwelling unit bedrooms (and sleeping areas of studio apartments).
9. Where single pole in trip sizes 20 amps or less, they are rated for switching duty.

2.4 FUSES

- A. Refer to Division 26, Section 26 28 13 "Fuses" for additional requirements.
- B. Select fuses in accordance with the following:
 1. Regardless of the actual available fault current they are, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical deliverable at the line side of the fuse.
 2. They are suitable for application to fuse gaps which reject other types of fusing. Coordinate with supplier(s) of all fusible switch units (in panels, switchboards, etc.) for the project to ensure that fuse gaps match the specified fuse types.
 3. Except as noted hereinafter, in sizes up to 600 amps, they are of the Class "J" time delay type, capable of carrying 500 percent of rated current for not less than 10 seconds and U.L. listed as a "Class J" fuse. Fuses are Shawmutt Type "AJT", Bussmann Type "LPJ", or other approved. Approval is contingent on certified test data demonstrating full compliance with the following requirements:
 - a. Fuse carries 500 percent of rating for at least 10 seconds.
 - b. Fuse suitable for motor feeders when applied at 150 percent of motor full load current.
 - c. Fuse selectivity with downstream fuses is:
 - 1) 2:1 with "J" time delay
 - 2) 3:1 with "RK-5" time delay
 - 3) 2:1 with "RK-1" time delay
 4. Except as noted hereinafter, in sizes over 600 amps, they are of the current limiting type, U.L. listed as "Class L".
 5. Fuses to be used in current limiting circuit breakers, regardless of actual available fault current, at full recovery voltage, are capable of safely interrupting fault currents in the order of 200,000 amperes RMS symmetrical of 280,000 amperes RMS asymmetrical. The current limiting fuses coordinate with and back up the circuit breakers they are associated with so that all fault overload currents occurring within the safe capability of the breakers cause the breakers to open, and all currents occurring beyond the safe capability of the breakers cause the fuses to open; the opening of fuses being such as to prevent damage to any circuit breaker component parts. Where directed, fuses are reduced in size so as to provide backup protection for downstream overcurrent devices.



2.5 COMPACT MOLDED CASE CIRCUIT BREAKERS (FOR APARTMENT PANELS)

- A. Select compact molded case breakers in accordance with the following:-
1. They consist of manually operated quick-make, quick-break mechanically trip free operating mechanisms for simultaneous operating of all poles, with contacts, and trip elements for each pole, all enclosed in molded phenolic plastic cases. Trip units for these breakers are of the "thermalmagnetic" type having bimetallic elements for time delay overload protection and magnetic elements for short circuit protection.
 2. They have an interrupting rating of at least 10,000 amperes RMS asymmetrical, unless otherwise indicated on panel schedules.
 3. They are of a type capable of being used with main devices incorporated in the panelette, or upstream devices, to establish the required series rated short circuit capability indicated elsewhere.
 4. They may be of the plug in type but are arranged for tamper resistant mounting to prevent the interchange of breakers having trip sizes outside of prescribed ranges.
 5. They are equipped with 5 milliamp ground fault interrupting features where so indicated or where required by code.
 6. They are equipped with arc-fault interrupting features where so indicated, and/or where they supply 120 volt, single phase, 15- and 20-ampere outlets in dwelling unit bedrooms (and sleeping areas of studio apartments).

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

END OF SECTION 26 28 00



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SECTION 26 28 13

FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. This Section includes cartridge fuses, rated 600 V and less, for use in switches, switchboards, controllers and spare fuse cabinets.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings for each fuse type indicated.
- C. Product Data: Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 2. Let-through current curves for fuses with current-limiting characteristics.
 - 3. Time-current curves, coordination charts and tables, and related data.
 - 4. Fuse size for elevator feeders and elevator disconnect switches.
- D. Maintenance Data: For fuses to include in emergency operation and maintenance manuals.
 - 1. In addition to terms specified in DDC General Conditions Section “Operation and Maintenance Data”, include the following:
 - a. Let-through current curves fuses with current-limiting characteristics.
 - b. Time-Current curve, coordination charts and tables, and related data.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Source Limitations: Provide fuses from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100 and marked for intended use.



- D. Comply with NEMA FU 1.
- E. Comply with NYC Electrical Code.

1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F ((4.4 deg C)) or more than 100 deg F ((38 deg C)), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

- A. Coordinate fuse ratings with HVAC and refrigeration equipment nameplate limitations of maximum fuse size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
 - 1. Cooper Bussman, Inc.
 - 2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.
 - 3. Ferraz Shawmut.
 - 4. Or Approved Equal

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

2.3 SPARE FUSE CABINET

- A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch ((40-mm)) high letters on exterior of door.
 - 4. Fuse Pullers: For each size fuse.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 EXAMINATION

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FUSE APPLICATIONS

- A. Refer to Division 26, Section 26 28 00 “Low Voltage Circuit Protective Devices” for determination of fuse types for installation throughout the distribution system.

3.4 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare fuse cabinets.

3.5 IDENTIFICATION

- A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 26 28 13



**Department of
Design and
Construction**

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SECTION 26 28 16.13

ENCLOSED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes: Molded-case circuit breakers (MCCBs).

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For circuit breakers, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Current and voltage ratings.
 - 2. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 3. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 4. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
- C. Shop Drawings: For circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power wiring.
- D. Qualification Data: For qualified testing agency.
- E. Field quality-control reports.
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Manufacturer's field service report.
- G. Operation and Maintenance Data: For circuit breakers to include in operation and maintenance manuals. In addition include the following:
 - 1. Manufacturer's written instructions for testing and adjusting circuit breakers.



2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Testing Agency Qualifications: Member company of NETA or an NRTL.
- C. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- D. Source Limitations: Obtain circuit breakers, components, and accessories, within same product category, from single source from single manufacturer.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F

1.6 COORDINATION

- A. Coordinate layout and installation of circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Square D; a brand of Schneider Electric.
 4. Or Approved Equal.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.



- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
- D. Current-Limiting Circuit Breakers: Frame sizes 200 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- E. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine elements and surfaces to receive circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- B. Comply with NECA 1.

3.4 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems".
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- C. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.5 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. **Acceptance Testing Preparation:**
 - 1. Test insulation resistance for each main circuit breaker, component, connecting supply, and feeder.
 - 2. Test continuity of each circuit.
- C. **Tests and Inspections:**
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies circuit breakers. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16.13



SECTION 26 28 16. 16

ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Non-fusible switches.
 - 3. Receptacle switches.
 - 4. Shunt trip switches.
 - 5. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- C. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.
- D. Field quality-control reports.
- E. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.



- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
 - 5. Or Approved Equal
- B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Six Pole, Single Throw, 240-V ac, 200 A and Smaller: 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Double Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 4. Lugs: Suitable for number, size, and conductor material.
 - 5. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:



1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
 5. Or Approved Equal
- B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 3. Lugs: Suitable for number, size, and conductor material.

2.3 ENCLOSURES

- A. Enclosed Switches: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
1. Indoor, Dry and Clean Locations: NEMA 250, Type 1
 2. Outdoor Locations: NEMA 250, Type 3R

2.4 FUSES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bussman
 2. Gould-Shawmut
 3. Littlefuse
 4. Or as approved equal
- B. Fuses:
1. Fuses 600A and less: ANSI/UL 198E, class RK 5, sized as indicated on drawings, dual element, current limiting, time delay one-time fuse, 600-volt.
 2. Interrupting rating: 200,000A RMS.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1 – Standard for Good Workmanship in Electrical Construction.

3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. See DDC General Conditions "Quality Requirements" for retesting and reinspecting requirements and DDC General Conditions "Execution" for requirements for correcting the Work.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 28 16.16

SECTION 26 29 13

ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes the following enclosed controllers rated 600 V and less:
 - 1. Full-voltage manual.
 - 2. Full-voltage magnetic.
 - 3. Multispeed.

1.3 DEFINITIONS

- A. CPT: Control power transformer.
- B. MCCB: Molded-case circuit breaker.
- C. MCP: Motor circuit protector.
- D. N.C.: Normally closed.
- E. N.O.: Normally open.
- F. OCPD: Overcurrent protective device.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: For each type of enclosed controller.
- C. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.
 - 1. Wiring Diagrams: For power, signal, and control wiring.

- D. Field quality-control reports.
- E. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 FULL-VOLTAGE CONTROLLERS

- A. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.
- B. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Or Approved Equal
 - 2. Configuration: Non-reversing
 - 3. Surface mounting.
 - 4. Pilot light.
- C. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Or Approved Equal



2. Configuration: Non-reversing
 3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; bimetallic type or ; melting alloy type.
 4. Surface mounting.
 5. Pilot light.
- D. Integral Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Or Approved Equal
 2. Configuration: Non-reversing
 3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters and sensors in each phase, matched to nameplate full-load current of actual protected motor and having appropriate adjustment for duty cycle; external reset push button; bimetallic type or melting alloy type.
 4. Surface mounting.
 5. Pilot light.
- E. Magnetic Controllers: Full voltage, across the line, electrically held.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Or Approved Equal
 2. Configuration: Nonreversing.
 3. Contactor Coils: Pressure-encapsulated type.
 - a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 4. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 5. Control Circuits: 24 V ac; obtained from integral CPT, with primary and secondary fuses, of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.



6. Melting Alloy Overload Relays:
 - a. Inverse-time-current characteristic.
 - b. Class 20 tripping characteristic.
 - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 7. Bimetallic Overload Relays:
 - a. Inverse-time-current characteristic.
 - b. Class 20 tripping characteristic.
 - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 8. Solid-State Overload Relay:
 - a. Switch or dial selectable for motor running overload protection.
 - b. Sensors in each phase.
 - c. Class 10/20 selectable tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 9. External overload reset push button.
- F. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Or Approved Equal
 2. Fusible Disconnecting Means:
 - a. NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class R fuses.
 - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 3. Nonfusible Disconnecting Means:
 - a. NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
 - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 4. MCP Disconnecting Means:
 - a. UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
 - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.



- c. Auxiliary contacts "a" and "b" arranged to activate with MCP handle.
- 5. MCCB Disconnecting Means:
 - a. UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
 - b. Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - c. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - d. Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.

2.2 ENCLOSURES

- A. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.
 - 1. Dry and Clean Indoor Locations: Type 1.
 - 2. Outdoor Locations: Type 3R
 - 3. Wash-Down Areas: Type 4X, stainless steel
 - 4. Other Wet or Damp Indoor Locations: Type 4
 - 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type 12.

2.3 ACCESSORIES

- A. Push Buttons, Pilot Lights, and Selector Switches: NEMA ICS 5; heavy-duty type; factory installed in controller enclosure cover unless otherwise indicated.
- B. Control Relays: Auxiliary and adjustable time-delay relays.
- C. Phase-Failure, Phase-Reversal, and Undervoltage and Overvoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connections. Provide adjustable undervoltage, overvoltage, and time-delay settings.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height, and with disconnect operating handles not higher than 79 inches above finished floor, unless otherwise indicated, and by bolting units to wall or mounting on lightweight



structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 26 Section "Hangers and Supports for Electrical Systems."

- B. Floor-Mounted Controllers: Install enclosed controllers on 4-inch nominal-thickness concrete base. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete".
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in each fusible-switch enclosed controller.
- E. Install fuses in control circuits if not factory installed. Comply with requirements in Division 26 Section "Fuses."
- F. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.
- G. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved nameplate.
 - 3. Label each enclosure-mounted control and pilot device.

3.4 CONTROL WIRING INSTALLATION

- A. Install wiring between enclosed controllers and remote devices comply with requirements in Section 26 05 19 "Low Voltage Power Conductors and Cables."
- B. Bundle, train, and support wiring in enclosures.



- C. Connect selector switches and other automatic-control selection devices where applicable.
 - 1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
 - 2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed controller, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Inspect controllers, wiring, components, connections, and equipment installation.
 - 2. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.
 - 3. Test continuity of each circuit.
 - 4. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Commissioner before starting the motor(s).
 - 5. Test each motor for proper phase rotation.
 - 6. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed controllers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Set field-adjustable switches and overload-relay pickup and trip ranges.



- B. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Commissioner before increasing settings.

3.7 DEMONSTRATION

- A. Instruct City of New York's staff to adjust, operate, and maintain enclosed controllers.

END OF SECTION 26 29 13



SECTION 26 31 00

PHOTOVOLTAIC COLLECTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (the City of New York Standard Construction Contract)

1.2 SUMMARY

- A. Section includes grid connected photovoltaic power system without storage as which includes some inactive PV panels within the building's skylight system.

1.3 RELATED SECTIONS

- A. Section 26 31 01 – “Data Acquisition for Photovoltaic System”

1.4 DEFINITIONS

- A. ETFE: Ethylene tetrafluoroethylene.
- B. FEP: Fluorinated ethylene propylene.
- C. IP Code: Required ingress protection to comply with IEC 60529.
- D. MPPT: Maximum power point tracking.
- E. PTC: PVUSA Test Condition. Commonly regarded as a "real-world" measure of PV output. See below for definition of "PVUSA."
- F. PV: Photovoltaic.
- G. PVUSA: Photovoltaics for Utility Systems Applications.
- H. STC: Standard Test Conditions defined in IEC 61215.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Product Data: For the following:
 - 1. PV Module
 - 2. Combiner Box
 - 3. DC Disconnect
 - 4. Inverter
 - 5. AC Disconnect



6. AC Panelboard
 7. Data Acquisition System (DAS)
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, components, and location and identification of each field connection. Show access, workspace, and clearance requirements; details of control panels; and data acquisition system (DAS) arrangement.
1. Wiring Diagrams: Detail DC and AC interconnecting wiring; and power, signal, and control wiring.
 2. Elevation and details of control and indication displays.
- D. Qualification Data: For testing agency.
- E. Source quality-control test reports.
- F. Field quality- control test reports.
- G. Operation and Maintenance Data: For photovoltaic system equipment to include in emergency, operation, and maintenance manuals
- H. Warranty: Special warranty specified in this Section.
- 1.6 QUALITY ASSURANCE
- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
 - B. Testing Agency Qualifications: Member company of the InterNational Electrical Testing Association or is an NRTL.
 - C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100 and marked for intended use.
 - D. Photovoltaic System: IEC 1215 Certification, IEEE 1262 Certification, UL listing with Class C or better fire rating.
 - E. DC-AC Inverter must meet UL1741 standards.
 - F. Interconnection must meet standards required by Con Edison.
 - G. Comply with the New York City amended NFPA 70 (specifically Article 690) and NFPA 101
 - H. Comply with all 2014 New York City Building Codes.
 - I. Installation to be coordinated with skylight manufacturer.
 - J. Installer must be a licensed electrical installer.



1.7 WORKMANSHIP

- A. Work must be performed in accordance with the installation and operation instructions provided by equipment manufacturers and in accordance with this specification.
- B. All work must be conducted in a professional manner with appropriate courtesy toward and coordination with other workers on site.
- C. All work must be conducted in a safe manner in accordance with all appropriate safety guidelines and regulations.
- D. Work areas must be kept clean and orderly. Any waste, excess material or packaging must be promptly removed and disposed of properly.

1.8 SCOPE OF WORK

- A. Provide the materials, parts, labor, tools and equipment necessary to install and warrant the Grid-Interactive Photovoltaic Power System (PV System) described in this specification. The PV System must include a Data Acquisition System (DAS).
- B. Installer will be responsible for obtaining all applicable approvals, permits, and inspections associated with the PV System, its installation, and its interconnection to the utility grid.
- C. Installer must carry out all pertinent inspections, be responsible for correcting any identified deficiencies, and host any needed re-inspections.
- D. Coordinate with City of New York the application for utility interconnection approval from local utility.
- E. Installer will be responsible for installing the PV System and associated materials and equipment in accordance with all appropriate electrical, building, and occupational safety codes.
- F. Materials must include, but not be limited to, the primary components of the PV System, the Data Acquisition System (DAS), and all necessary balance of system (BOS) materials.
- G. The primary components of the PV System must include a PV Array, DC-AC inverter (NEMA 3R), electrical room disconnects and combiner, and isolation transformer as specified in Part 2 of this section.
- H. The DAS must include (as described in Part 2 of this section) rooftop environmental sensors, sensors in the main electrical room to measure power parameters, a data-logger and meter in the electrical room, PC software for electronically communicating and sharing data in an educational format, and an interactive lobby kiosk.
- I. BOS materials must include but not be limited to: conduit, wire, over-current protection devices, junction boxes, pull boxes, enclosures, hardware, fasteners, surge suppression devices and any other accessories or materials needed to properly install the PV System and the DAS.
- J. Installation must be done in accordance with this specification and must include:
 - 1. Installing and wiring the module in all locations indicated on drawings.



2. Installing source circuit combiners, sub-array disconnects, and DAS sensors at the rooftop location.
 3. Conduit and wiring within the rooftop PV array.
 4. Wiring from the rooftop PV array and DAS to the DC-AC inverter, AC Disconnect and to panel PVP in Electrical Room.
 5. Installation of disconnects, combiner, DC-AC inverter, conduit, wire, BOS, and DAS to PV fused disconnect in Electrical Room 214.
 6. Wiring from the PV system AC disconnect (along roof line), through the AC utility disconnect, to the point of utility interconnection in a load center within electrical room.
 7. Interconnection of PV System with utility grid
 8. Labeling, placards and laminated riser diagram to meet code and utility requirements.
 9. Labeling to identify system components,
 10. Labeling of wires for polarity, circuit, phase,
 11. Installation of DAS software on PC
 12. Verification/inspection/testing of installation work,
 13. Hosting of all pertinent inspections.
 14. System commissioning.
- K. Installer will be responsible for system operation testing, system commissioning, and providing operating instructions.

1.9 WORK BY OTHER TRADES

- A. Provide the materials, parts, labor, tools and equipment necessary to install and warrant the Grid-Interactive Photovoltaic Power System (PV System) described in this specification. The PV System must include a Data Acquisition System (DAS).
- B. Conduit from the AC Disconnect along roof to the electrical room (C04) will be coordinated with other trades. Rooftop locations of conduits for power wires and for signal wires are shown will be indicated on shop drawing.
- C. Panelboard and Circuit Breakers at point of interconnection in electrical room C04 must be provided and installed by the electrical contractor in accordance with NEC 690.64 (B). All circuit breakers must be capable of two-way flow of power.
- D. Provide PC computer to be used as the DAS server and its connection to the facilities computer network. This DAS server must be a dedicated device. Its connection to the facilities computer network is to allow sharing of PV system information with other user computers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment in fully enclosed vehicles.
- B. Store equipment in spaces having environments controlled within manufacturers' written instructions for ambient temperature and humidity conditions for non-operating equipment.



- C. All materials must be stored and handled on site in a manner that does not damage or have the potential to damage the facility (for instance: roof membrane must be protected, and roof structure must not be overloaded).
- D. All material must be stored, delivered, and handled in a manner that does not endanger personnel at the site.
- E. All materials must be handled with adequate and appropriate equipment.

1.11 GUARANTEE/ WARRANTY

- A. Contractor must guarantee complete system to be free from defects in materials or workmanship for a period of one year following the date of the substantial completion.
 - 1. This guarantee will include service at the site to replace or restore to full function components documented to be defective during that one-year period.
 - 2. Utilize manufacturer's warranties to obtain replacements for defective materials and components but provide troubleshooting services to document failures; must obtain appropriate service/support from manufacturer; and labor, transportation, and disposal costs involved in removing defective materials and components and installing replacements during that one-year period.
- B. PV modules must have a 20-year (minimum) warranty that power output at Standard Test Conditions (STC) must remain at 80% or greater of power rating at STC. STC is defined as irradiance of 1000 Watts per square meter, ambient temperature of 25 degrees C, and spectral distribution of AM 1.5.
- C. Inverter and transformer must have a 5-year (minimum) warranty.
- D. Support system must have a 20-year (minimum) warranty.

1.12 OPERATION AND MAINTENANCE MANUAL

- A. Provide a comprehensive Operation and Maintenance Manual for the PV System.
- B. Manual must include specification sheets and manufacturers' Operation and Maintenance Manuals for all primary components as well as a description and guidance for overall system operation.

PART 2 - GENERAL

2.1 PHOTOVOLTAIC MODULE

- A. Subject to compliance with requirements, photovoltaic solar panels compliant with New York State Department of Public Service Certified Interconnection Equipment documentation by one of the following:
 - 1. Solar Electric Supply, Inc (www.solarelectricsupply.com).
 - 2. Terra Solar (www.terrasolar.com).
 - 3. LG (www.lg.com).
 - 4. Cooper Electric Energy Solutions (www.cooper-electric.com).



5. Trina Solar (www.trinasolar.com).
6. Sun Power (www.us.sunpower.com).
7. Or Approved Equal.

- B. The PV array must incorporate panels resulting in the footprint not exceeding the area shown on the Contract Documents. Provide 8 spare modules for the City of New York. Panels must be ¼” thick and capable of withstanding all loading requirements.
- C. Individual PV modules must have a rated power (at STC) of 200 Watts or more to keep the number of wiring connections in the system to a reasonable number.

2.2 WIRE AND CONDUIT

- A. Exterior and interior conduit associated with the PV system must be EMT of appropriate inside diameter for the number and size of wires to be run.
- B. Exposed PV module wiring must be kept to a minimum, must be properly rated for sunlight resistance, must be properly rated for the hot temperatures associated with the PV array (90 degrees C insulation) and must be properly secured to avoid physical damage from wind, snow, or other environmental factors. Means of securing exposed wiring must be sunlight resistant and able to withstand expected rooftop environmental factors over the life of the system.
- C. DC wiring must be Underground Service Entrance cable (USE-2) .
- D. DAS signal wire must meet all the DAS manufacturer’s guidelines and must not be run in the same conduit as electrical power wiring.
- E. Conduit from the rooftop to the main electrical room (including a separate one for DAS signal wire) must be provided by other trades.
- F. All wire must be UL listed, new, stranded copper and continuous for each wiring run. Fine stranded wiring is not acceptable.
- G. Insulation must be rated for 600V.
- H. All conductor terminations must be rated for 600V, be UL listed and meet the instructions furnished with each component. Any terminal block used must be listed as suitable for use with field installed wiring.
- I. Power wire must be sized for a voltage drop of 2% or less between PV modules and inverter.

2.3 DC to AC POWER INVERTER

- A. Subject to compliance with requirements, provide a 3-phase, 60Hz, 208VAC inverter output capability of the system and meet the requirements below by one of the following:
 1. SMA America, Inc (www.sma-america.com).
 2. Cooper Electric Energy Solutions (www.cooper-electric.com).
 3. Sun Power (www.us.sunpower.com).
 4. Fronius Symo (www.fronius-usa.com).
 5. Or Approved Equal.



- B. Each inverter must have a capacity to receive at least 3 series strings of Photovoltaic modules otherwise provide DC Circuit Combiners.
- C. Each inverter must come with integral DC disconnect otherwise provide DC disconnect to each inverter.
- D. The inverter must be a grid-interactive, non-battery-based model with firmware 8.94 (or other firmware version accepted by New York State Department of Public Service Certified Interconnection Equipment list).
- E. The inverter must be designed to accept the PV array output and must be listed to UL1741 standards and must be acceptable to the local utility and the New York State Department of Public Service Certified Interconnection equipment documentation. The inverter must start, synchronize, operate, and disconnect automatically without the need for user action or intervention. The inverter must be capable of operating in parallel with other grid interactive inverters.
- F. The inverter must have the following protective functions: AC over/under voltage, AC under/over frequency, over temperature, AC and DC over current, DC over voltage.

2.4 UTILITY INTERCONNECTION

- A. An AC utility disconnect must be installed in accordance with the utility requirements (ConEd's Blue Book, "A Customer Guide to Electrical Service Installation") between the AC Combiner and the point of utility interconnection. Coordinate with Con Ed to locate this disconnect where it must meet accessibility requirements, minimize vandalism risk, and maximize user safety.
- B. The AC Combiner and the 3-phase, 208VAC 200A fused disconnect in the main electrical room, which must serve as the PV System's point of interconnection to the utility power system, must be provided by others in accordance with NEC690.64 (B). The AC Combiner must be a 200A 120/208V 3P4W 30-pole panelboard, NEMA 3R.

2.5 INTERTIE PROTECTION RELAY

- A. Subject to compliance with requirements, provide AC Intertie Protection Relay by one of the following:
 - 1. Beckwith Electric Co., Inc. (www.beckwithelectric.com).
 - 2. Cooper Electric Energy Solutions (www.cooper-electric.com).
 - 3. Sun Power (www.us.sunpower.com).
 - 4. Schweitzer Engineering Laboratories (www.selinc.com).
 - 5. Or Approved Equal.

2.6 DATA ACQUISITION SYSTEM

- A. Refer to specification section 26 31 01 – "Data Acquisition for Photovoltaic System".

2.7 PHOTOVOLTAIC PANEL SUPPORT SYSTEM

- A. The panels must be supported by non-penetrating support system with ballast.



- B. The support system must provide the require direction and tilt angles for the panels as indicated on drawing E-103.

2.8 ENCLOSURES

- A. NEMA 250, Type 3R steel cabinets with access to components through hinged doors with flush tumbler lock and latch for all outdoor applications.
- B. Finish: Manufacturer's standard baked-enamel finish over corrosion-resistant prime treatment.

2.9 SOURCE QUALITY CONTROL

- A. Factory test complete inverter system before shipment.
- B. Observation of Test: Give 14 days' advance notice of tests and provide access for Commissioner to observe tests at Commissioner's option.
- C. Report test results. Include the following data:
 - 1. Description of input source and output loads used. Describe actions required to simulate source load variation and various operating conditions and malfunctions.
 - 2. List of indications, parameter values, and system responses considered satisfactory for each test action. Include tabulation of actual observations during test.
 - 3. List of instruments and equipment used in factory tests.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 SAFETY PRECAUTIONS

- A. Installer must ensure that all work under Installer's control is conducted in accordance with all applicable safety codes and requirements and practices including but not limited to OSHA requirements, 2014 NYC Electrical Code and specific job requirements.
- B. Installer must participate in site safety meetings and must communicate all appropriate safety information to employees and subcontractors in a timely manner.
- C. Installer is responsible for knowing how to safely install a high voltage PV power system and how to ensure that circuits are de-energized prior to conducting work on them. PV power systems involve special safety challenges because PV modules generate electricity whenever they are exposed to sunlight. In high voltage PV systems there is the potential for shock and arc capable of causing serious injury or death.
- D. Installer is be responsible for ensuring that other workers on site are not exposed to undue hazards associated with the PV installation.



- E. Installer is responsible for conducting a safe operation and for ensuring that appropriate protective equipment is utilized by personnel under Installer's direction.
- F. Installer is responsible for ensuring that all employees and subcontractors under Installer's direction have the appropriate experience and training to safely accomplish the tasks being assigned to them.
- G. Installer must report all accidents at the jobsite involving employees and/or subcontractors.
- H. Installer must identify safety hazards and risks and communicate them to appropriate personnel prior to the commencement of work.
- I. Installer must ensure that there will always be a minimum of two people working together.

3.3 INSTALLATION

- A. All components must be installed in accordance with manufacturers' manuals, guidelines, and instructions.
- B. All work must be done in accordance with applicable codes and in accordance with 2014 NYC Building Code and latest edition of NYC Electrical Code.
- C. Installer must arrange a pre-installation conference with all appropriate parties to communicate procedures, safety information, schedules, and responsibilities and to coordinate with other work efforts.
- D. All DC wiring and components must be labeled for polarity and circuit. All AC wiring and components must be labeled for phase.
- E. All DAS wiring must be labeled.
- F. All connections must be torqued to manufacturers' specifications.
- G. All metal components including module frames must be grounded in accordance with 2014 NYC Electrical Code.
- H. Installer is responsible for removing and properly disposing of any excess or waste material generated in association with the delivery and installation of the PV System.
- I. Work area and system components must be clean and orderly during installation and at the completion of the project.
- J. All components must be properly labeled. Labels must conform to the requirements of all 2014 NYC electrical Code, 2011 National Electrical Code and UL. Exterior labels must be rated for outdoor use. Location of PV System disconnects must be described in the form of a laminated approved shop drawing riser diagram at the Service Entrance.
- K. All fuses must be removed, and all circuit breakers and switches must be left in the open position between system installation and system testing.
- L. All junction boxes and other locations of module wiring connections must be made accessible



3.4 FIELD TESTING OF PV MODULES

- A. All individual PV modules must be field tested at the project site during the installation process to verify performance.
- B. Open Circuit Voltage (Voc) and Short Circuit Current (Isc) must be measured and recorded along with the module serial number, ambient temperature, and plane-of array solar irradiance. Testing must occur under reasonably clear weather conditions and during mid-day hours. Testing records must be submitted to the Commissioner.
- C. Measurements must be compared to values provided by module manufacturer to determine whether each module is operating properly. Solar Contractor must return defective modules to the module manufacturer for warranty replacement.

3.5 CONNECTIONS

- A. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams, unless otherwise indicated.
- B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
 - 1. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping systems as indicated; comply with NFPA 70.
 - 2. All exposed metal surfaces of the PV system must have an equipment grounding conductor in accordance with NEC 2005 Articles 690.45 and 250.122.
- C. Connect wiring according to Section 26 05 19 "Low-Voltage Power Conductors and Cables."

3.6 IDENTIFICATION

- A. Identify equipment and components according to Section 26 05 53 "Identification of Electrical Work".

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Tests and Inspections:
 - 1. Inspect interiors of enclosures for integrity of mechanical and electrical connections, component type and labeling verification, and ratings of installed components.
 - 2. Test manual and automatic operational features and system protective and alarm functions.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specifications. Certify compliance with test parameters.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.



5. Remove and replace malfunctioning units and retest as specified above.

3.8 INSTALLATION INSPECTION

- A. After the system has been installed but before it is energized, conduct an inspection to verify that:
 1. All components are installed in a neat, workmanlike manner.
 2. All components and materials are in new condition and installed in accordance with manufacturers' manuals and guidelines.
 3. Appropriate torque has been used in tightening wire connections and fasteners (random checks).
 4. Appropriate fasteners have been used throughout the system.
 5. All outdoor components and materials are rated for such use and expected to last for the life of the system.
 6. All wiring is new, continuous, copper, 600V rated, with proper insulation for its location, and properly secured and protected for the life of the system.
 7. All non-current carrying metal materials are properly grounded.
 8. PV negative conductors are not switched.
 9. All conductors are labeled as to proper circuit and proper polarity.
 10. Surge suppressors are installed and correctly wired.
 11. DAS has been properly installed and wired.
- B. Arrange for and host electrical inspection of the PV system.

3.9 PRE-COMMISSIONING TESTING

- A. With all disconnects open, all fuses removed and all circuit breakers off use a digital multi-meter to confirm that conductor polarities are correct and connected to the correct terminals.
- B. Carefully test the outputs of individual series strings (Voc and Isc), and sub-arrays (Voc) to identify and correct any inconsistencies. Testing must occur under reasonably clear weather conditions and during mid-day hours and test results must be recorded and submitted to Commissioner.
- C. Testing should proceed from series strings to sub-arrays on the roof and then to the electrical room DC disconnects and circuit combiner. Polarities must be checked at every step. Fuses must be installed and switches closed only after polarities and wiring have been checked thoroughly.
- D. Pre-commissioning testing must stop at the inverter DC disconnects. This disconnect must remain in the open position.

3.10 COMMISSIONING AND PERFORMANCE TESTING

- A. Ensure that commissioning and performance testing involve the inverter manufacturer or the inverter manufacturer's designated representative.
- B. Inverter start-up and commissioning must occur only after all AC and DC connections to the inverter and transformer and point of interconnection load center have been checked for polarity, phase, labeling, and torque.



- C. Inverter start-up must be accomplished via the manufacturer's procedures and checklists.
- D. Testing of the inverter's output performance must be conducted during reasonably clear weather conditions and during mid-day hours. System AC output in kW must be measured along with ambient temperature (at the array and in the electrical room) and plane-of-array solar irradiance. AC inverter output must be measured for the whole system and also for each individual subarray (with all other sub-arrays disconnected). Measurements must be recorded and submitted to the Commissioner.
- E. Verify that the system performs properly over the course of a solar day including: automatic morning start-up, full power daytime operation, and automatic nighttime shut down.
- F. Proper operation of the DAS must be verified during performance testing.
- G. Any anomalous or unsatisfactory performance must be corrected and the system retested.
- H. Arrange for and host the utility inspection and must coordinate with the utility to address any issues brought forward by the utility.

3.11 ACCEPTANCE

- A. Once the inverter and the system have successfully undergone electrical inspection, commissioning and performance testing, and utility inspection, present the system Operation and Maintenance Manual to City of New York's staff and conduct a 3-hour session to familiarize appropriate facility representatives with system start-up, operation, and shut down and with the Data Acquisition System.
- B. Manual must include as-built electrical and mechanical drawings, product cut sheets, manufacturers' operation and maintenance manuals, maintenance schedules and procedures, troubleshooting procedures, warranty information, and contact information.
- C. The City of New York's staff must be instructed on the operation of the DAS, its measurement capabilities, the use of its software, and its educational opportunities.

3.12 DEMONSTRATION

- A. Engage a factory-authorized service representative to instruct City of New York's staff to adjust, operate, and maintain photovoltaic system.

END OF SECTION 26 31 00



SECTION 26 31 01

DATA ACQUISITION FOR PHOTOVOLTAIC SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes web- based photovoltaic system data acquisition system (DAS)

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.5 INTRODUCTION

- A. This specification covers the meter/data logger, communications/data transfer requirements, and monitoring/administration requirements for a solar photovoltaic (PV) data acquisition system (“DAS”). The objective of the DAS is to provide real-time information on solar PV systems’ production for City of New York. The DAS will enable tracking and reporting on solar PV system performance metrics (i.e. energy production, cost savings, emissions reductions) and monitor system performance for the purposes of operation and maintenance (i.e. equipment failures).
- B. Web-based DAS must be provided to enable real-time performance monitoring of solar PV system components.
- C. Data Acquisition System(s) will include the following hardware components integrated into one or more metal NEMA 4 enclosures.

1.6 COORDINATION

- A. Coordinate Work of this Section with installation, placement and needs of power and data connection at all equipment locations



- B. Coordinate Work of this Section with DAS installer and City of New York’s IT administrator for local network provisioning and port access as necessary.

1.7 WARRANTY

- A. Minimum 5-year manufacturer’s warranty of service, support, and replacement, from date of substantial completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Solar PV Monitoring Hardware.
 - 1. Non-proprietary open-source data loggers.
 - 2. Manufacturer: Subject to compliance requirements, provide products by one of the following:
 - a. Obvius
 - b. Campbell Scientific
 - c. Data Logger Inc.
 - d. Or approved equal.
 - 3. Revenue grade energy meters.
 - 4. Environmental sensors including all of the following: Plane of array irradiance, Ambient temperature, Module temperature, Wind speed, and Wind direction.
 - 5. Establish data connections between all solar PV system components to enable a minimum of inverter(s) performance/status monitoring.
- B. Solar PV Monitoring Software
 - 1. Web-based software application for the purpose of solar PV system performance monitoring.
 - 2. Manufacturer: Subject to compliance requirements, provide products by one of the following:
 - a. Tangent AMP,
 - b. Also Energy Inc.,
 - c. BlueNRGY LLC,
 - d. Or approved equal.
 - 3. Offers customizable feature set enabling display of performance data to the general public



4. Application Program Interface (“API”) access enabling custom interface to Solar PV Monitoring System for the purpose of data exchange or configuration.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements, provide products to meet the specification below by one of the following:
 1. SMA America, Inc (www.sma-america.com)
 2. Cooper Electric Energy Solutions (www.cooper-electric.com)
 3. Sun Power (www.us.sunpower.com)
 4. Fronius Symo (www.fronius-usa.com)
 5. Heliotronics (www.heliotronics.com)
 6. Or Approved Equal

2.3 GENERAL DESCRIPTION

- A. The DAS must be designed for use with 208 VAC 3 phase power and 600VDC power.
- B. The rooftop sensors must measure Ambient Temperature, Module Temperature, Wind Speed, and Plane-of-Array Irradiance for both array angles.
- C. Electrical room sensors must measure current, voltage, and power in kilowatts (kW) and energy in kilowatt-hours (kWh) on both the AC side and the DC side.
- D. Electrical room sensors must accommodate the large wiring associated with a 12 kW PV system.
- E. There must be a kWh meter installed in the main electrical room to display total AC kWh output. This meter must meet MTC specifications:
 1. The PV system must have dedicated meter that records only the AC output from the inverter of the PV system. This meter is separate from the utility billing meter and should not interfere with utility billing or net-metering. The PV system meter must be a standard utility revenue quality meter that conforms with applicable American National Standards Institute (ANSI) C-12 standards with a visible display for cumulative energy (kWh) produced by the PV system. All system components, including meters, must comply with all applicable codes& standards. The meter should be installed on the AC output side of the inverter, and must be available for periodic testing and/or recalibration, if necessary.
- F. The DAS and associated software must be PC-based.
- G. The DAS must sample required parameters at least 30 times per minute and log 15-minute averages. Logged kWh data must not be lost as a result of a power outage.



- H. DAS PC software must be designed to capture data from the data logger and display it in an informative and educational format.
- I. The DAS software must capture data (15-minute averages) for the life of the system in a common recording format (Comma Separated Values or Access Compatible Database) thereby allowing manipulation, plotting, and upload of the data.

2.4 FUNCTIONAL DESCRIPTION OF SOLAR PV MONITORING SYSTEM HARDWARE

- A. DAS data logger to include the following features:
 - 1. Operating conditions:
 - a. Operating temperature range -30 degrees C to 70 degrees C.
 - b. Operating humidity range from 0% to 95%, non-condensing.
 - 2. Inputs:
 - a. Modbus RS232/RS485 or similar standard communication protocol.
 - 3. Two-way site communication through supported protocols:
 - a. TCP/IP over Ethernet for HTTP data transmission via PROXY.
 - b. File Transfer Protocol (FTP).
 - 4. Memory and storage requirements:
 - a. Non-volatile storage capacity for 1 month of 15-minute interval data from a single device when remote server connection is unavailable.
 - b. First in, first out file storage management.
 - c. Support for expandable USB memory device with the ability to disable USB operations if required.
 - 5. Listed or recognized for intended usage by an NRTL.
 - 6. Capable of being set to a Static IP Address with a primary and secondary DNS server
 - 7. Capable of recording data at a minimum 1-minute interval.
 - 8. Capable of remote configuration via web portal.
 - 9. Support for power by 24VDC.
 - 10. UL, CSA, FCC, Agency Approvals
- B. Revenue grade energy meter to include the following features:
 - 1. Operating conditions:
 - a. Operating temperature range -30 degrees C to 70 degrees C.
 - b. Operating humidity range from 0% to 95%, non-condensing.
 - 2. Inputs:



- a. Voltage, mA or 5A current type current transformers
 - b. Direct voltage inputs up to 600V
 3. Optional integrated I-Block
 4. Communications via Modbus RTU
 5. Minimum accuracy of 0.5%
 6. Preconfigured for use with supplied CTs
 7. Measured quantities per phase:
 - a. Power (kW)
 - b. Accumulated energy imported (kWh)
 - c. Accumulated energy generated (kWh)
 - d. Accumulated net energy generated (kWh)
 - e. Voltage (V)
 - f. Current (A)
 - g. Frequency (Hz)
 - h. Reactive power (kVAR)
 - i. Apparent power (kVA)
 - j. Power factor
 8. Measured quantities averaged across phases:
 - a. Voltage (V)
 - b. Current (A)
 - c. Power factor
 9. Total of all phases
 - a. Power (kW)
 - b. Accumulated energy imported (kWh)
 - c. Accumulated energy generated (kWh)
 - d. Accumulated net energy generated (kWh)
 - e. Current (A)
 - f. Reactive power (kVAR)
 - g. Apparent power (kVA)
- C. Environmental sensors to include the following features:
 1. Sensors to measure the following data points:
 - a. Plane of array irradiance (W/m²)



- b. Ambient temperature (°C or °F)
 - c. Module temperature (°C or °F)
 - d. Wind speed (mph)
 - e. Wind Direction
 2. Suitable analog to digital converter capable of transmitting data using Modbus RTU protocol.
 3. Operating conditions appropriate for installation setting.
 - a. Irradiance sensor capable of low thermal drift over operational temperature range.
 - b. Irradiance sensor to be UV resistant.
 - c. Ambient temperature sensor to be shielded from direct solar radiation.
 - d. Module temperature sensor operating range -30C to 80C.
 - D. Assembly:
 1. Enclosure UL Listed NEMA 4.
 2. ETL Listed, Conforms to U.L. Standard 61010 and CSA 22.2.
 3. Power Supplies conform to UL 60950-1, EN60950-1, EN6100-4, CE.
 4. 120VAC/277VAC or 480VAC three phase delta power supplies.
- 2.5 FUNCTIONAL DESCRIPTION OF SOLAR PV MONITORING SYSTEM SOFTWARE
- A. Web Based Software: Internet Explorer, Firefox, Chrome or equivalent.
 - B. Host and maintain software application on software manufacturer's data servers enabling application to be accessed on the web.
 - C. Provide integration to monitoring hardware which enables live data from DAS to be displayed on web interface.
 - D. Fifteen-minute data to be stored for contract term, extendable at customer's request.
 - E. Solar PV monitoring software features:
 1. Views to include the following features:
 - a. Unique, publicly accessible URL address.
 - b. Real-time system data depicted in graphically in gauges or charts.
 - 1) Current system power output.
 - 2) Accumulated energy production.
 - c. Historical system data.



- 1) Displays expected photovoltaic performance, actual photovoltaic performance, cost savings, and environmental sensor data points through interactive graphs.
 - a) Daily
 - b) Weekly
 - c) Monthly
 - d) Yearly
- d. Calculated Energy Savings (\$).
- e. Environmental equivalency information.
- f. Graphical displays indicating energy produced in terms of CO2 offset.
- g. Customization options to include:
 - 1) Logo.
 - 2) Color scheme.
 - 3) Photographs.
 - 4) System details.
- h. Live weather data from environmental sensors or local National Oceanic and Atmospheric Administration station feed.
- i. Administration level site to include the following features:
 - 1) Secure, password protected accounts.
 - 2) Interactive, real-time display of all collected data.
- j. Advanced graphical suite including:
 - 1) User selected data fields.
 - 2) User selected timeframes.
- k. Complete download access to:
 - 1) Raw data directly from meters and environmental sensors in .csv formatted files.
 - 2) User created tables and datasets.
 - 3) Prepared and totaled data over any timeframe in the following intervals: Yearly, Monthly, Daily, Hourly, 15-minute.
- l. Detailed system statistics including:
 - 1) Representations and comparisons to historical performance.
 - 2) Peak performance trends.
 - 3) Capacity factor data.
- m. User configurable alarms.



- 1) Automatic email notifications when specified thresholds are met, such as equipment failures and suboptimal solar PV system performance/energy production, including but not limited to:
 - a) Inverter Failures.
 - b) Decreased Energy Production.
 2. Portfolio site to include the following features:
 - a. Secure, password protected access.
 - b. Aggregate system performance graphs and data.
 - c. Aggregate system statistics.
 - d. Geographic display of systems.
 - e. Direct creation and management of additional accounts.
 - f. User groups with custom feature sets and access levels.
 - g. User configurable reports.
- F. Data must be stored in a “cloud hosted” environment with the highest standards of redundancy and disaster recovery.
- G. DAS software provider must be qualified to submit production and other data to Utilities, Regulatory agencies, and State or Federal entities if required.
- H. Data must be easily downloadable via an API.
- I. Complete data history can be downloaded at one time.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 COORDINATION

- A. Coordinate with electrician to install communications and power wiring.
1. Communication wire must be appropriate for protocol.
 2. Shielded twisted pair with dedicated reference for Modbus.
 3. Communication wire should be installed in dedicated conduit where necessary.
 4. DC power wiring to be sized to minimize voltage drop.
- B. Coordinate with photovoltaic system installer to install environmental sensors during PV panel installation.



- C. Coordinate with photovoltaic system installer for integration.
- D. Coordinate with IT department for network provisioning.

3.3 INSTALLATION

- A. The equipment must be factory wired ready for field connections for power and data.
- B. Provide phone support during the installation of solar PV monitoring system hardware. Follow Manufacturer's installation recommendations and requirements during installation.
- C. Provide full software deployment within 2 business days of site commissioning.
 - 1. Initial set up of five users – Two Administrators and three users
 - 2. Site set up of all devices..
 - 3. Basic Alert set-up of Communication Faults and Device Faults.
- D. Provide Single Line Drawings and schematics as part of deliverables.

3.4 FIELD QUALITY CONTROL

- A. Inspect hardware for defects and physical damage, labeling of Nationally Recognized Testing Laboratories (NRTL) and nameplate compliance with the Contract Documents.
- B. Confirm energy meter power readings with reference to photovoltaic inverter display.

END OF SECTION 26 31 01



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SECTION 26 32 14

GENERATOR TAP BOX

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Generator Tap Box.

1.3 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Generator tap boxes must be UL listed and labeled under the UL 1008 standard with a minimum 42KA withstand rating.
- C. Generator tap box manufacturer must provide a complete factory assembled and tested generator tap box.
- D. Generator tap box installation must meet all applicable NEC standards.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Contractor must submit manufacturer’s drawings and data of generator tap boxes for Commissioner’s approval prior to start of fabrication. Drawings and data must include, as a minimum, dimensioned general arrangement drawings, UL listing information including UL control or file number, component data, mounting provisions, conduit entry locations and installation instructions.

1.5 WARRANTY

- A. Generator tap boxes must be covered by manufacturer’s warranty for a minimum period of (1) one year after substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Powertron
 - 2. ESL Power Systems, Inc
 - 3. Power Temp Systems, Inc
 - 4. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 5. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 6. Siemens Energy & Automation, Inc.
 - 7. Or Approved Equal
- B. All equipment must be new.
- C. Generator tap box manufacturer must have produced and sold UL 1008 Listed generator tap boxes as a standard product for a minimum of (2) years.
- D. Contractor will be responsible for the equipment until it has been installed and is finally inspected, tested and accepted in accordance with the requirements of this Specification.

2.2 GENERATOR TAP BOX

- A. Generator tap box must consist of cam-style male connectors and grounding terminals, all housed within a pad lockable enclosure.
- B. Generator tap box enclosure must be NEMA Type 3R, constructed of continuous seam welded, powder coated galvaneal steel. The main access must be through a hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs must be via a) drawn flange cable entry openings in the bottom of the enclosure for wall mount units, or b) hinged lower door for pad mount units. A hinged flap door must be provided to cover the cable openings when cables are not connected; the hinged flap door must allow cable entry only after the main access door has been opened.
- C. Enclosure must be Stainless Steel after fabrication.
- D. Cam-style male connectors (inlets) must be UL Listed single-pole separable type and rated 400 amps at 600VAC. Cam-style male connectors must be color coded. Cam style male connectors must be provided for each phase and for ground and must also be provided for neutral if required. The ground cam-style male connectors must be bonded to the enclosure, and a ground lug must be provided for connection of the facility ground conductor. None of the cam-style male connectors must be accessible unless the main access door is open.



- E. Provide receptacles for generator battery charger and block heater.
 - 1. One 20A, grounded, weatherproof, NEMA 5-20R.
 - 2. One 30A, grounded, weatherproof, NEMA 6-30R.

PART 3 - PRODUCTS

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Prior to installation of generator tap boxes, Contractor must examine the areas and conditions under which the generator tap box is to be installed and notify the Commissioner in writing if unsatisfactory conditions exist.
- B. Generator tap box must be installed as shown on the drawings and per the manufacturer's written instructions. In addition, the installation must meet the requirements of local codes, the National Electrical Code and National Electrical Contractors Association's "Standard of Installation"
- C. Conduit entry into the manual transfer switch must be by Contractor; Contractor must furnish and install listed watertight conduit hubs for each conduit entry on the generator tap box. The hub size must match the conduit size for conductors and ground as shown on the drawings. Hubs must be properly installed and tightened to maintain Type 3R integrity of the generator tap box.
- D. Contractor must terminate conductors and ground per the manufacturer's instructions. All field wiring terminations in the generator tap box must be torqued as required per the instructions on the generator tap box.

3.3 FIELD TESTING

- A. Prior to energizing generator tap box, the Contractor must perform the following checks and tests as a minimum:
 - 1. Verify mounting and connections are complete and secure.
 - 2. Verify internal components and wiring are secure.
 - 3. Perform continuity check of all circuits.
 - 4. Perform 1,000 VDC megger test on phase and ground cables.
 - 5. Verify dead front is secure.
 - 6. Confirm operation of the generator tap box ground receptacle by attaching a plug to the generator tap box ground receptacle and then verify that the plug is grounded to the facility ground.

END OF SECTION 26 32 14

SECTION 26 36 00

TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes manual transfer switches rated 600 V and less.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- C. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
- D. Field quality-control test reports.
- E. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100 and marked for intended use.
- C. Comply with NEMA ICS 1.
- D. Comply with NFPA 70.
- E. Comply with NFPA 99.
- F. Comply with NFPA 110.

- G. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Contactor Transfer Switches:
 - a. Kohler Power Systems; Generator Division.
 - b. Emerson; ASCO Power Technologies, LP.
 - c. Caterpillar; Engine Div.
 - d. GE Zenith Controls.
 - e. Or Approved Equal
 2. Transfer Switches Using Molded-Case Switches or Circuit Breakers:
 - a. AC Data Systems, Inc.
 - b. Eaton Electrical Inc.; Cutler-Hammer.
 - c. GE Zenith Controls.
 - d. Hubbell Industrial Controls, Inc.
 - e. Or Approved Equal

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination must exceed indicated fault-current value at installation location.
- C. Solid-State Controls: Repetitive accuracy of all settings must be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components must meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components must meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

- F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
 - 2. Switch Action: Double throw; mechanically held in both directions.
 - 3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, must have separate arcing contacts.
- G. Neutral Switching. Where four-pole switches are indicated, provide overlapping neutral contacts.
- H. Neutral Terminal: Solid and fully rated, unless otherwise indicated.
- I. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral must be double the nominal rating of circuit in which switch is installed.
- J. Enclosures: General-purpose NEMA 250, Type 3R, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Provide each fastener and support to carry unit load.
- B. Floor-Mounting Switch: Anchor to floor by bolting.
 - 1. Concrete Bases: 4 inches high, reinforced, with chamfered edges. Extend base no more than 4 inches in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Section 26 05 29 "Hangers and Supports for Electrical Systems."
- C. Identify components according to Section 26 05 53 "Identification for Electrical Work."

- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.3 CONNECTIONS

- A. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
 - 2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
 - a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
 - 5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
 - f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- B. Coordinate tests with tests of generator and run them concurrently.
- C. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to instruct City of New York's staff to adjust, operate, and maintain transfer switches and related equipment as specified below.
- B. Coordinate this instruction with that for generator equipment.

END OF SECTION 26 36 00

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SECTION 26 50 00

LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

- A. Work of this section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.
- B. The work shall include but not be limited to the following:
1. Complete shop fabrication
 2. Delivery to job site
 3. Installation at designated locations, and controls as noted
 4. Lamping and lamps
 5. Lamp focusing
 6. Cleaning and protection

1.3 DESCRIPTION OF WORK

- A. Furnish and install a lighting fixture of the type indicated by letter at each location shown on the drawings.
- B. All materials, accessories, and any other equipment necessary for the complete and proper installation of all lighting fixtures included in this Section shall be furnished by the Contractor.
- C. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.
- D. U.L. Listing: All fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the Underwriters' Laboratories, Inc. "Standards for Safety," and others as they may be applicable. A UL listing shall be provided for each fixture type, and the

appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.

1.4 REFERENCE STANDARDS

- A. ANSI/NFPA 70 – National Electrical Code
- B. 2014 New York City Electrical Code
- C. 2014 New York City Building Code (and Reference Standards)
- D. Underwriters Laboratory (UL)
- E. National Electrical Manufacturers Association (NEMA)
- F. Uniform Building Code, 1988 Edition for Seismic Design Requirements
 - 1. Lighting fixtures: Section 47.1813 requires fixtures weighting less than 56 pounds to have two (2) number 12 hangers from the housing to the structure above; more than 56 pounds requires "approved" hanger pendant fixtures to be hung directly from the structure above.
- G. Aluminum Association (AA)
- H. American Iron and Steel Institute (AISI)

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Shop Drawings shall clearly indicate the contract drawing number of fixture details used as reference in the development of the shop drawings, and the names of the job, and Commissioner.
- C. The Contractor shall coordinate all the lighting fixture drawings with the drawings and details of the Architectural, Structural, Electrical, Mechanical, and other related trades to assure a perfect and efficient installation.
- D. No variation from the general arrangement and details indicated on the drawing shall be made on the shop drawings unless required to suit the actual conditions on the premises, and then only with the written approval of the Commissioner.
- E. Catalogue cuts lacking sufficient detail to indicate compliance with contract documents will not be acceptable.
- F. Timely submission: Shop drawings for all lighting fixtures shall be received no later than sixty days after award of Contract.
- G. Review of shop drawings or samples does not waive contract requirements.



- H. Photometric Data: Where indicated on the fixture schedule and contract drawings, supply complete photometric data for the fixture including optical performance rendered by independent testing laboratory, developed according to methods of U.S.A. Illuminating Engineering Society. For down and semi-down lights used for general illumination:
 - 1. Coefficients of utilization.
 - 2. Visual Comfort Probability data (fluorescent only for 100 foot-candles), rooms with reflectances of 80 percent (ceiling), 50 percent (walls), and 20 percent (floor), including a (20 ft. by 20 ft.) room with 10 ft. ceiling and luminaires lengthwise.
 - 3. Candlepower data, presented graphically and numerically, in 5 degree increments (5 degree, 10 degree, 15 degree, etc.). Data developed for up and down quadrants normal, parallel, and at 22-1/2°, 45°, 167-1/2° to lamps if light output is asymmetric.
 - 4. Zonal lumens stated numerically in 10 degree increments (5 degree, 15 degree, etc.) as above.
- I. For area and roadway luminaires isocandela charts, coefficients of utilization, and IES roadway distribution classification.
- J. Supply photometric data for any fixture offered in substitution for a specified fixture.

1.6 SHOP DRAWINGS

- A. Submit shop drawings to the Commissioner for review in accordance with the requirements of the Contract Documents.
- B. Shop drawings shall include details and cuts of each fixture type scheduled herein, and shall include for each type the following information.
 - 1. Type, lamping, size, material exterior and exterior, ballast type (where applicable), lenses, baffles, finishes, and means and methods of attachment.
 - 2. Include photometric data for each fixture.
 - 3. Submit thermal test data for ballasts regarding the tripping class P units based on the specified criteria.
- C. Submit reflected ceiling plans, sections and details so as to locate and define each fixture type and its location.
- D. Clearly indicate work to be provided by other trade subcontractors and coordinate accordingly.
- E. Indicate wiring and control circuits.
- F. To accommodate the seismic requirements, indicate supplementary spring type supports from the buildings structure for all fixtures 2 foot square in area and above.

1.7 SAMPLES

- A. After shop drawing approval, and prior to release for manufacturing, the Contractor shall furnish one sample of each fixture on the fixture schedule and contract drawings.
- B. Shipping: The samples shall be complete with specified lamp(s) ready for handing, energizing, and examining, and shall be shipped, to the Commissioner, or as otherwise advised.
- C. Sufficient time shall be allowed for thorough examination of the samples by the Commissioner.
- D. Samples are not returnable, nor included in quantities listed for a project.
- E. Samples must be actual working unit of materials to be supplied.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand new, and manufacturer's name. Delivered material shall be identical to the reviewed submittals.
- B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged, or otherwise not suitable for installation from the job site and replace with acceptable materials.
- C. The fixtures shall be delivered to the job site fully fabricated and assembled and ready for installation. Lamps shall be shipped separately.
- D. For luminaires incorporating Alzak cones or reflector/cones for protection pending completion of the installation: these components shall be supplied bulk packed in cartons separate from the luminaires. Unit packaging of cones or reflector/cones with luminaires is not acceptable.

1.9 WARRANTY

- A. Installation checkout: Upon completion of initial system installation and fixture cleaning, the Contractor shall notify the Commissioner that the system has been completed. At this time, the Contractor shall verify that the installation has been done in full accordance with the Contract Documents and is in full and complete working order.
- B. The Manufacturer shall warranty all lighting fixtures and major components, except lamps, for a period of two (2) years after Substantial Completion of the project. The guarantee shall be in acceptable form and shall be signed and notarized by a person or persons authorized to execute such a document on behalf of the company.
- C. Ballast shall carry three-year warranty.

1.10 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 20 00 "Quality Requirements".

PART 2 PRODUCTS

2.1 LUMINAIRES

A. Type A1

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 2' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-2FT-LTG1- 3000K-120-SM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 16.5 watts LED, color temperature to be 3000K, 2815 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

B. Type A2

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt



4. Nominal Dimensions: Nominal fixture dimensions 4' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-4FT-LTG1- 3000K-120-SM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 33 watts LED, color temperature to be 3000K, 2815 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

C. Type A2-EM

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and integral battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 4' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-4FT-LTG1- 3000K-120-SM-EM or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting



- c. Or approved equal.
6. Lamps: 33 watts LED, color temperature to be 3000K, 2815 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

D. Type A3

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 8' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-8FT-LTG1- 3000K-120-SM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 66 watts LED, color temperature to be 3000K, 5630 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.



E. Type A4

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 12' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series - LS2-LED-12FT-LTG1-3000K-120-SM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 99 watts LED, color temperature to be 3000K, 8445 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

F. Type A4-EM

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt



4. Nominal Dimensions: Nominal fixture dimensions 12' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide Available Manufacturers: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-12FT-LTG1- 3000K-120-SM-EM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 99 watts LED, color temperature to be 3000K, 8445 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

G. Type A5-EM

1. Fixture: Surface mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 6' length x 2-1/2" width x 2-11/16" depth. Basis-of-Design Product: Subject to compliance with requirements provide
5. Basis-of-Design Product: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-12FT-LTG1- 3000K-120-SM-EM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting



c. Or approved equal.

6. Lamps: 99 watts LED, color temperature to be 3000K, 8445 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

H. Type B2-EM

1. Fixture: Aircraft cable mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and integral battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 4' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-4FT-LTG1-3000K-120-AC-EM, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 33 watts LED, color temperature to be 3000K, 2815 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.



9. Listing and Labeling: Fixture must be UL listed.

I. Type B3

1. Fixture: Aircraft cable mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 8' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-8FT-LTG1-3000K-120-AC, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 66 watts LED, color temperature to be 3000K, 5630 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

J. Type B3-EM

1. Fixture: Aircraft cable mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.



3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 8' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-8FT-LTG1-3000K-120-AC-EM or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 66 watts LED, color temperature to be 3000K, 5630 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

K. Type B4

1. Fixture: Aircraft cable mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 12' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-12FT-LTG1-3000K-120-AC, or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting



c. Or approved equal.

6. Lamps: 99 watts LED, color temperature to be 3000K, 8445 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

L. Type B4-EM

1. Fixture: Aircraft cable mounted direct distribution LED luminaire.
2. Construction: Powder-coated white extruded aluminum housing with snap-in frosted lens. Integral LED driver and battery pack. The aircraft suspension kit shall have a white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate shall be white powder-coated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 12' length x 2-1/2" width x 2-11/16" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Coronet LS2 Series – LS2-LED-12FT-LTG1-3000K-120-AC-EM or comparable product by one of the following:
 - a. Zumtobel
 - b. Cooper Lighting
 - c. Or approved equal.
6. Lamps: 99 watts LED, color temperature to be 3000K, 8445 lumens.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.



9. Listing and Labeling: Fixture must be UL listed.

M. Type C1

1. Fixture: Ceiling recessed circular LED wet location luminaire.
2. Construction: Fully diffuse clear reflector, white flange.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 4” diam aperture, housing 13” length x 11” width x 7-3/8” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Edison Price Lighting – SHW-FTD3-4DL-L11-120-30K-ECOL-WF or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 13 watts LED, color temperature to be 3000K, 1100 lumens, CRI 80, min. 50,000 hours rated life.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for wet locations.

N. Type C2

1. Fixture: Ceiling recessed circular LED luminaire.
2. Construction: Fully diffuse clear reflector, white flange.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 5” diam aperture, housing 14-1/2” length x 10” width x 7” depth.



5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Edison Price Lighting – AP-CLW-5-L30-30K-120-ECOL-WF or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 40 watts LED, color temperature to be 3000K, 3000 lumens, CRI 90, min. 50,000 hours rated life.
7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

O. Type D1

1. Fixture: Surface mounted circular LED luminaire, suitable for wet locations.
2. Construction: Powder-coated dark grey aluminum housing with opal diffuser. Integral LED driver.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 11.5” diam x 4.75” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Starus – C-GL40-3000K or comparable product by one of the following:
 - a. Philips
 - b. Metalux
 - c. Or approved equal.
6. Lamps: 40 watts LED, color temperature to be 3000K, 3320 lumens, CRI 75 min., min. 50,000 hours rated life.
7. Driver: Integral LED driver.



8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for wet locations.

P. Type F1

1. Fixture: Recessed undercabinet circular LED luminaire.
2. Construction: Die-cast aluminum fixture, stamped steel housing for surface mount. Glass beam spread lens.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 1-1/2” diam aperture, housing 2-1/4” diam x 7/8” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide WAC lighting - HR-LED87-30-BK or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 4.8watts LED, color temperature to be 3000K, 180 lumens, CRI 85, 70,000 hours rated life.
7. Driver: Integral LED driver, dimmable. Dimming driver specifications to be verified with electrical trade.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

Q. Type H1

1. Fixture: Wall recessed square LED exterior location luminaire.



2. Construction: Die-cast marine grade aluminum housing with integral wiring compartment, shielded safety glass, reflector made of pure anodized aluminum. Silver (SLV) polyester powder coat to be 3mil thickness.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 9-7/8” width x 9-7/8” height x 5-3/8” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Bega – 22254 -SLV or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 30 watts LED, color temperature to be 3000K, 460 lumens, CRI 85, min. 50,000 hours rated life.
7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for exterior/wet locations.

R. Type J1

1. Fixture: Drive-over in-grade LED exterior location adjustable floodlight luminaire for installation with high pressure loads.
2. Construction: High tensile cast strength stainless steel. Heavy gauge trim ring. Tempered ½” thick clear safety glass. Weather tight operation achieved through use of molded high temperature silicone gasket. Flush top surface. Machined #4 stainless steel finish.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 13” diam. x 10” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Bega – 77852 or comparable product by one of the following:



- a. Erco
- b. Kurt Versen
- c. Or approved equal.

6. Lamps: 29 watts LED, color temperature to be 3000K, 1348 lumens, CRI 80, min. 50,000 hours rated life.
7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for exterior/wet locations.

S. Type K1

1. Fixture: Wall mounted LED luminaire with cutoff optics.
2. Construction: One-piece die-cast aluminum designed for attachment to wall over a standard 3-1/2” or 4” octagonal junction box. Die castings are marine grade, copper free (\leq 0.3% copper content) A360.0 aluminum alloy. Tempered, matte glass diffuser. One-piece, die-cast aluminum, louvered face plate. Reflector made of pure anodized aluminum. Fully gasketed for weather tight operation using silicone gasket. Standard finishes are polyester powder coat with minimum 3 mil thickness.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 16” length x 5” width x 3” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Bega – 22175-BLK or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 6 watts LED, color temperature to be 3000K, 536 lumens, CRI 85, 50000 hours rated life.



7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for exterior/wet locations.
10. Emergency Inverter: One inverter for a combination of three K1 and K2 fixtures, verify and confirm location of wiring connection prior to procurement: Surelite INV125SI or approved equal. Verify with electrical specifications.

T. Type K2

1. Fixture: Wall mounted LED luminaire with cutoff optics.
2. Construction: One-piece die-cast aluminum designed for attachment to wall over a standard 3-1/2" or 4" octagonal junction box. Die castings are marine grade, copper free (\leq 0.3% copper content) A360.0 aluminum alloy. Tempered, matte glass diffuser. One-piece, die-cast aluminum, louvered face plate. Reflector made of pure anodized aluminum. Fully gasketed for weather tight operation using silicone gasket. Standard finishes are polyester powder coat with minimum 3 mil thickness.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 16" length x 5" width x 3" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Bega – 22175-SLV or comparable product by one of the following:
 - a. Erco
 - b. Kurt Versen
 - c. Or approved equal.
6. Lamps: 6 watts LED, color temperature to be 3000K, 536 lumens, CRI 85, 50000 hours rated life.
7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for exterior/wet locations.



10. Emergency Inverter: One inverter for a combination of three K1 and K2 fixtures, verify and confirm location of wiring connection: Subject to compliance with requirements, provide Surelite INV125SI, or a comparable product from:
 - a. Cooper Lighting
 - b. AtLite
 - c. Or approved equal.

U. Type L1-EM

1. Fixture: Ceiling mounted emergency luminaire.
2. Construction: High-impact, mar-resistant, injection-molded thermoplastic covering, two directional PAR18 incandescent gimbal-Type lighting heads, with maintenance-free lead calcium battery. AC line-latching, brown circuit and low battery voltage circuit.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 12-1/4" length x 5" width x 2-1/2" depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Atlite PC1-10-BLK or comparable product by one of the following:
 - a. McPhilben
 - b. Lithonia
 - c. Or approved equal.
6. Lamps: PAR18 incandescent.
7. Charger: Solid-state charger with emergency output short circuit protection.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for wet locations.

V. Type M1

1. Fixture: Wall surface mounted jelly jar LED luminaire, suitable for wet locations.



2. Construction: Cast-aluminum housing with corrosion resistant paint in industrial grey finish. Sealed gaskets to protect against moisture and dust.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 4-1/2” diam x 10-5/8” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Lithonia Lighting – OLVTWM or comparable product by one of the following:
 - a. Starus
 - b. Philips
 - c. Metalux
 - d. Or approved equal.
6. Lamps: 15 watts LED, color temperature to be 4000K, 600 lumens, CRI 74 min., 39 lumen per Watt, min. 50,000 hours rated life.
7. Driver: Integral LED driver.
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed for wet locations. Tested in accordance with IESNA LM-79 and LM-80 standards. 4Kv surge protection standard.

W. Type N1

1. Fixture: Suspension mounted circular high bay LED luminaire, suitable for wet locations.
2. Construction: Diecast aluminum housing and heatsink. White polyester powder coat finish painted after fabrication. With wire guard accessory. Mounted with 1/2” threaded hub and accessory hook as required.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture dimensions 14” diam x 8.65” depth.
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Metalux – UHB-24-UNV-L840-CD-U + UHB-ALR14or comparable product by one of the following:



- a. Philips
 - b. Starus
 - c. Or approved equal.
-
6. Lamps: 197 watts LED, color temperature to be 4000K, 24000 lumens, CRI 80 min., min. 60,000 hours rated life.
 7. Driver: Integral LED driver.
 8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
 9. Listing and Labeling: Fixture must be UL listed for wet locations, IP65 rated. Tested in accordance with IESNA LM-79 and LM-80 standards.

X. Type P1

1. Exterior LED indirect pole light fixture & 25'-0" pole
2. Fixture Pole Top Luminaire shall include remote electronic driver located at fixture, Die cast aluminum housing, corrosion resistant polyester, meets 1000-hour salt water spray certified, 450watts, photocell, surge protection, with 2-3/8" tenon with minimum 4.72 tenon length. Pole shall be 25' long minimum 6" diameter round straight marine grade extruded aluminum tubing, with 2-3/8" round tenon luminaire mounting as per above, pole access handhole shall be 6' above grade with internal fixture branch wiring supports. Round cast aluminum anchor base and steel anchor bolts, provide proper foundation see drawings for details. Provide internal (1) GFCI receptacle for security camera at 18' AFF and (1) convenience GFCI receptacle at 6'-6" AFF integral to pole with in-use covers. Provide mounting bracket for security camera.
3. White LEDs Color temperature 4000K, CRI80+

Y. Type ELV-4

1. Fixture – Wall mounted utility luminaire.
2. Construction: Cast-aluminum housing with corrosion resistant paint in an industrial grey finish, and a gasket seal to protect against moisture and dust.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture dimensions 4-1/2" diam x 7-7/16" depth x 11-5/16" height.



5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Lithonia OLVTWM or comparable product by one of the following:
 - a. McPhilben
 - b. Lithonia
 - c. Or approved equal.
6. Lamps: 15 watts LED, color temperature to be 4000K, 50000 hours rated life.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

Z. Type EX-1

1. Fixture – Optical Operation: Commissioner-approved, wall mounted one-sided exit sign.
2. Construction: Die-cast aluminum housing and face plate. Stencil to be aluminum finish, with 8" red letters for Commissioner's approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Atlite XLA2-8-D-R-1 or comparable product by one of the following:
 - a. McPhilben
 - b. Lithonia
 - c. Or approved equal.
6. Lamps: LED illumination strip.
7. Ballast: N/A



8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

AA. Type EX-2

1. Fixture – Optical Operation: Commissioner-approved, ceiling mounted one-sided exit sign.
2. Construction: Die-cast aluminum housing and face plate, with a black, low-profile mounting canopy kit. Stencil to be aluminum finish, with 8" red letters for Commissioner's approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Atlite XLA2-8-D-R-1C-DCB or comparable product by one of the following:
 - a. McPhilben
 - b. Lithonia
 - c. Or approved equal.
6. Lamps: LED illumination strip.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

BB. Type EX-3

1. Fixture – Optical Operation: Commissioner approved, ceiling mounted double-sided exit sign.



2. Construction: Die-cast aluminum housing and face plate, with a black, low-profile mounting canopy kit. Stencil to be aluminum finish, with 8" red letters for Commissioner's approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
5. Basis-of-Design Product: Subject to compliance with requirements provide: Subject to compliance with requirements, provide Atlite XLA2-8-D-R-2C-DCB or comparable product by one of the following:
 - a. McPhilben
 - b. Lithonia
 - c. Or approved equal.
6. Lamps: LED illumination strip.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval. Contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

2.2 FIXTURE CONSTRUCTION (GENERAL)

- A. All materials, accessories, and other related fixture parts shall be new and free from defects which in any manner may impair their character, appearance, strength, durability and function, and be effectively protected from any damage or injury from the time of fabrication to the time of delivery and until final acceptance of the work.
- B. Enclosures: Fabricate fixture enclosures with a minimum of #20 gauge (0.0359 inch) thick cold rolled sheet steel. Enclosures may be constructed of other metals, provided they are equivalent in mechanical strength and acceptable for the purpose. Fabricate lighting fixtures to be finished in vitreous porcelain enamel from a minimum of #20 gauge enameling steel.
- C. Sheet Metal Work: All sheet metal work shall be free from tool marks and dents and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. All intersections and joints shall be formed true of adequate strength and structural rigidity to prevent any distortion after assembly.



- D. Housings shall be so constructed that all electrical components are easily accessible and replaceable without removing fixtures from their mountings, or disassembly of adjacent construction.
- E. Castings: All castings shall be exact replicas of the approved patterns and shall be free of sand pits, blemishes, scales and rust, and shall be smoothly finished. Tolerance shall be provided for any shrinkage of the metal castings in order that the finished castings will accurately fit in their designated locations.
- F. All lamp sockets in lighting fixtures shall be suitable for the indicated lamps and shall be set so that lamps are positioned in optically correct relation to all lighting fixture components. If adjustable socket positions are provided, socket should be preset in factory for lamp specified. If different socket positions are specified for same fixture, sockets shall be preset for each Type, and cartons marked accordingly.
- G. All fixtures shall be completely wired at the factory.
- H. Mounting Frames and Rings: If ceiling system requires, each recessed and semi-recessed fixture shall be furnished with a mounting frame or ring compatible with the ceiling in which they are to be installed. The frames and rings shall be one piece or constructed with electrically-welded butt joints, and of sufficient size and strength to sustain the weight of the fixture.
- I. Light leaks between ceiling trims of recessed lighting equipment and the ceilings will not be tolerated. If fixture is used in partially transparent ceiling, light leaks above the ceiling line will not be tolerated.
- J. Yokes, brackets and supplementary supporting members needed to mount lighting fixtures to carrier channels or other suitable ceiling members shall be furnished and installed by the Contractor.
- K. Outdoor Fixtures: Fixtures for use outdoors or in areas designated as damp locations shall be suitably gasketed to prevent the entrance of moisture. Provide approved wire mesh screens for ventilations openings.
- L. Hardware: For steel and aluminum fixtures, all screws, bolts, nuts and other fastenings and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, all hardware shall be stainless steel. For bronze fixtures, all hardware shall be stainless steel or bronze.
- M. Temperature: All fixtures and ballasts must operate within the temperature limits of their design and as specified by Underwriters' Laboratories, Inc. in the applications and mounting conditions herein specified.
- N. Adjustable Angle Fixtures: Each lighting fixture which has a beam angle adjustment shall have reliable angle locking devices.

- O. Oval Beam Fixtures: Each lighting fixture which has a lamp with an oval shape beam pattern shall contain lamp orientation locking devices to ensure that beam orientation is not distributed during future lamp replacement or cleaning.

2.3 REFLECTORS & TRIMS

- A. Installation: Reflectors, reflector cones and visible trim of all lighting fixtures shall not be installed until completion of plastering, ceiling tile work, painting and general clean-up. They shall be carefully handled to avoid scratching or finger-printing and shall be, at the time of acceptance by the City of New York, completely clean.
- B. All Alzak parabolic cones shall be guaranteed against discoloration for a minimum of ten years, and, in the event of premature discoloration, shall be replaced by the Manufacturer, including materials and the cost of labor. Reflectors for fluorescent fixtures using triphosphor lamp technology shall not produce a visible "rainbow" of light.
- C. Aluminum reflectors shall be finished specular, semi-specular, or diffuse as required and shall meet or exceed Alzak specifications. Minimum requirements of reflector finishes for interior and exterior service shall be as follows:

Minimum weight of coating per description of service.	Minimum reflectance percent square inch.	Specular	Diffuse
Normal interior commercial service	5.0	83.0	75.0
General interior industrial and exterior work reflector protected by glass covering.	7.5	82.0	73.0
Exterior industrial and commercial reflector not protected.	10.0	78.0	75.0
Exterior marine service reflector not protected.	13.0	78.0	65.0

2.4 LENSES

- A. Plastic for lenses and diffusers shall be formed of colorless 100% virgin acrylic. The quality of the raw material must exceed IES, SPI, and NEMA Specifications by at least 100% which, as a minimum standard, shall not exceed a yellowness factor of 3 after 2,000 hours of exposure in the Fade-meter or as tested by an independent test laboratory. Acrylic plastic lenses and diffusers shall be properly cast, molded or extruded as specified, and shall remain free of any

dimensional instability, discoloration, embrittlement, or loss of light transmittance for at least 15 years.

- B. Glass used for lenses, refractors, and diffusers in incandescent lighting fixtures shall be tempered for high impact and heat resistance. The glass shall be crystal clear in quality with a transmittance of not less than 88%. For exterior fixtures use tempered Borosilicate glass tempered Corning #7740 or as acceptable. For fixtures directly exposed to the elements and aimed above the horizontal with a radiant energy of 4.16 watts per square inch or greater, use Vycor glass.
- C. Where optical lenses are used, they shall be free from spherical and chromatic aberrations and other imperfections which may hinder the functional performance of the lenses.
- D. Mechanical: All lenses, louvers, or other light diffusing elements shall be removable, but positively held so that hinging or other normal motion will not cause them to drop out.
- E. Cleaning: All lenses shall be turned over to the City of New York clean and free of dust.

2.5 LAMP HOLDERS

- A. Incandescent: Body: porcelain; Screw Shall: nickel-plated brass, prelubricated with silicone compound.
- B. Fluorescent: Body: white urea plastic; Contacts: silver-plated phosphor bronze.

2.6 FINISHES

- A. Painted Surfaces: Synthetic enamel, with acrylic, alkyd, epoxy, polyester, or polyurethane base, light stabilized, baked on at 350° Fahrenheit minimum, catalytically or photochemically polymerized after application.
- B. White finishes: minimum of 85 percent reflectance.
- C. Ceiling opening frames shall either be manufactured of non-ferrous metal, or be suitably rustproofed after fabrication.
- D. Selection: Unless otherwise noted, finishes shall be as selected by the Commissioner.
- E. Undercoat: Except for stainless steel give ferrous metal surfaces a five stage phosphate treatment or other acceptable base bonding treatment before final painting and after fabrication.
- F. Unpainted non-reflecting surfaces shall be satin finished and coated with a baked-on clear lacquer to preserve the surface. Where aluminum surfaces are treated with an anodic process, the clear lacquer coating may be omitted.
- G. Unpainted Aluminum Surfaces: Finish interior aluminum trims with an anodized coating of not less than 7 mg. per square inch, of a color and surface finish as selected by the Commissioner.

Finish exterior aluminum and aluminum trims with an anodized coating of not less than 35 mg. per square inch, of a color and surface finish as selected by the Commissioner.

- H. Porcelain Enamel Surfaces: Apply porcelain finishes smoothly. Finish shall be not less than 7.5 mils thick of non-yellowing, white, vitreous porcelain enamel with a reflectance of not less than 85%.

2.7 LAMPS

- A. Manufacturer: Lamps shall be manufactured by General Electric, Philips, or Osram/Sylvania. Unless otherwise noted, all lamps of a given fixture designation and lamp type shall be supplied by the same manufacturer.
- B. Provide lamps for all lighting fixtures (furnished as part of the electric work).
- C. Incandescent and tungsten halogen lamps shall not be operated, other than for initial testing, prior to final inspection, lighting control programming and/or turnover of finished space to the City of New York. If incandescent or tungsten halogen lamps are operated by the contractor during construction, all lamps must be replaced by the contractor prior to the turnover to the City of New York.
- D. Compact fluorescent, linear fluorescent, metal halide and LED lamps shall not be operated, during construction for a period of more than four (4) months prior to turn over of the finished space to the City of New York. If lamps are operated longer than four (4) months prior to turnover to the City of New York, all lamps must be replaced by the contractor.

2.8 FLUORESCENT LIGHTING FIXTURES

- A. General Construction and Materials: Housing end plates, socket bridges, reflectors, wiring channels and ballast covers shall be die formed of not less than #20 gauge (0.0359 inch thick) cold rolled steel unless specified otherwise.
- B. Lampholders shall be heavy white with definite locking-in feature and silver-plated contacts for proper lamp operation and life. Outdoor lampholders shall be neoprene gasketed and compression type. Sockets with open-circuit voltage over 300 volts: safety type and designed to open supply circuit on lamp removal.
- C. Mount lamps on rapid-start circuits within one inch of grounded metal, minimum one inch wide, as long as lamp.
- D. Construct fixtures so that ballast may be serviced or replaced without removal of fixture housing.

2.9 FLUORESCENT BALLASTS

- A. Standard Magnetic: Where called for in the Lighting Fixture Schedule, provide two lamp and/or single lamp standard magnetic ballasts in any one fluorescent fixture. Fluorescent lighting fixture

magnetic ballasts (except single reactor type) shall be equipped with an internal, automatic resetting thermal protector adjacent to the coils, and on-time non-resetting thermal device to protect the capacitor. Ballasts shall be acceptable and listed by Underwriters' Laboratories Inc., as Class "P". Ballasts must have the manufacturer's best sound rating, and the sound rating indicated on the ballast. Ballasts shall be high power factor type, and shall be designed and constructed to maintain a case temperature not greater than 90°C when operated at a room ambient of 50°C when tested in accordance with UL and CBM standards. Ballasts shall be designated for single frequency operation 60 Hz. Nominal, and shall operate at the nominal voltages indicated on label, 120 volt and/or 277 volt as required.

- B. Electronic: Where called for in the Lighting Fixture Schedule, provide electronic ballasts for fluorescent light fixtures. Contractor is responsible for coordination of ballast compatibility with specified lamps. Electronic ballasts shall be acceptable and listed by Underwriters' Laboratories Inc., and Class "P" thermally protected. Ballasts shall have a power factor greater than 0.90, ballast factor equal to 0.93, total harmonic distortion less than 10%, and lamp current crest factor less than or equal to 1.6. Ballasts shall have a minimum starting temperature of 10° Celsius. Ballasts shall be free of Polychlorinated biphenyls (PCB's). Ballasts shall be designated for frequency of operation greater than 25 KHz nominal, and shall operate at the nominal voltages indicated on label, 120 volt and/or 277 volt as required.
1. It shall be possible to operate ballasts for different length lamps on a single circuit.
 2. It shall be possible to operate multiple lamp ballasts on a single circuit with no perceptible difference in lamp light output.
 3. Fixture and ballast combination shall be inaudible in a 27 db room ambient.
 4. Ballast shall comply with all applicable state and federal efficiency standards.
 5. Ballasts shall comply with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other normal electrical equipment.
 6. Ballasts shall meet all applicable ANSI and IEEE standards regarding harmonic distortion and surge protection.
 7. Ballasts shall not be affected by lamp failure and shall yield normal lamp life.
 8. Ballasts shall operate at an input frequency of 60 Hz and an input voltage of 108 to 132 (120V models) or 249 to 305 (277V models).
 9. Ballasts that operate as a parallel circuit shall allow remaining lamp(s) to maintain full output if companion lamp(s) fail.

2.10 INCANDESCENT AND HALOGEN LIGHTING FIXTURES

- A. General Construction and Materials: Incandescent lighting fixtures shall be listed and labeled by Underwriters' Laboratories, Inc., for installation in fireproof or non-fireproof construction, damp or wet locations, as required.
- B. Aluminum reflectors shall be Alzak (finish as selected) or as authorized, and not less than 0.057 inch thick unless specified otherwise.
- C. Lampholders shall be UL listed, and be heavy duty type constructed of high grade porcelain. Provide medium base sockets for lamps to and including 250 watts and mogul based sockets from 300 watts up to 1500 watts (rated for 1500 watts, 600 volt service) unless specified otherwise.
- D. Tungsten Halogen: Incandescent lighting fixtures utilizing tungsten halogen sources shall be designed and constructed so that lamp seal temperatures do not exceed 350°C at an ambient of 25°C when tested in accordance with UL Standard #57 and shall maintain an operating bulb wall temperature of approximately 600°C and not less than 250°C.
- E. Lead wires for fixtures utilizing tungsten halogen sources shall be rated for not less than 200°C operation but shall be rated for 250°C if temperature warrants.
- F. Temperature on reflectors shall not exceed 205°C at any point.
- G. Junction Boxes: All fixtures supplied for recessing in suspended ceiling shall be supplied with prewired junction boxes.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements

3.2 INSTALLATION

- A. Installation: Do not scale electrical drawings for exact location of the lighting fixtures. In general, the architectural reflected ceiling plans indicate the proper locations of lighting fixtures.
- B. Appurtenances: Install each fixture properly and safely. Furnish and erect hangers, rods, mounting brackets, supports, frames, and other equipment requirement.
- C. Coordination: Furnish lighting fixtures complete with appurtenances required for the proper, safe and distortion-free installation in the various surfaces in which they appear. Determine surface types from the Architectural drawings.
- D. Instructions: Each lighting fixture shall be packaged with complete instructions and illustrations showing how to install. Install lighting fixtures in strict conformance with manufacturer's recommendations and instructions.

- E. Rigidly align continuous rows of lighting fixtures for true in-line appearance.
- F. Pendant Fixtures: Install pendant lighting fixtures plumb and at a height from the floor as specified on the drawings. In cases where conditions make this impractical, refer to the Commissioner for a decision. Use ball aligners and canopies on pendant fixtures unless noted otherwise.
- G. Do not install fixtures and/or parts such as finishing plates and trims for recessed fixtures until all plastering and painting that may mar fixtures' finish has been completed.
- H. Mechanical Rooms: Lighting fixture locations in mechanical and electrical equipment rooms are approximate. Coordinate mounting height and location of lighting fixtures to clear mechanical, electrical and plumbing equipment and to illuminate adequately meters, gauges and equipment.
- I. Support all lighting fixtures independently of duct work or piping.
- J. Concealment: Whenever a fixture or its hanger canopy is applied to a surface mounted outlet box, a finishing ring shall be utilized to conceal the outlet box.
- K. Splices in internal wiring shall be made with approved insulated "wire nut" type mechanical connectors, suitable for the temperature and voltage conditions to which they are subjected.
- L. All wire utilized for connections to or between individual lamp sockets and lamp auxiliaries (i.e., wires which do not constitute "through circuit" wiring) shall be suitable for temperature, current, and voltage conditions to which it is subjected.
- M. Install reflector cones, baffles, aperture plates, light controlling element for air handling fixtures, and decorative elements after completion of ceiling tiles, painting and general cleanup.
- N. Replace blemished damaged or unsatisfactory fixtures as directed.

3.3 AIMING AND ADJUSTMENT

- A. All adjustable lighting units shall be aimed, focused, locked, etc., by the Contractor under the supervision of the Commissioner. The Commissioner shall indicate the number of crews (foreman and apprentice) required. All aiming and adjusting shall be carried out after the entire installation is complete. All ladders, scaffolds, etc. required shall be furnished by the Contractor at the direction of the Commissioner. As aiming and adjusting is completed, locking set-screws and bolts and nuts shall be tightened securely.
- B. Night Work: Where possible, unit shall be focused during the normal working day. However, where daylight interferes with seeing, aiming shall be accomplished at night.

3.4 CLEANUP

- A. At the time of final acceptance by the City of New York, all lighting fixtures shall have been thoroughly cleaned with materials and methods recommended by the manufacturers, all broken



parts shall have been recommended by the manufacturers, all broken parts shall have been replaced, and all lamps shall be operative.

3.5 MAINTENANCE MANUALS

- A. The Contractor shall be responsible for obtaining from the supplying lighting manufacturers, for each type of lighting fixture, a recommended maintenance manual including:
 - 1. Tools required.
 - 2. Types of cleaners to be used.
 - 3. Replacement parts identification lists.
 - 4. Final, as-built shop drawings.
- B. Six (6) bound copies of this material shall be forwarded to the City of New York.

END OF SECTION 26 50 00



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SECTION 27 10 00 - STRUCTURED CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Quality Assurance.
 - 2. Project Record Documents.
 - 3. Pathways.
 - 4. Cable Trays..
 - 5. Telephone Terminal Backboards.
 - 6. 110-Style Wiring Blocks
 - 7. Copper Patch Panels, Category 6A.
 - 8. Fiber Optic Systems
 - 9. Category 6A/Fiber/Coax Cabling.
 - 10. Work Station Outlets.
 - 11. Uninterruptible Power Supply.
 - 12. Examination.
 - 13. Installation.
 - 14. Instruction Manuals.
 - 15. Guarantee.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".



1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. All work must be done by a qualified Category 6A Installer authorized by cabling solution manufacturer. Any defects or malfunctions in the system resulting from improper installation must be corrected at no additional cost to the City of New York. Questions must be directed to the Commissioner.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record location of service entrance conduit and termination backboards and cabinets.
- B. Label each cable at both ends.

1.6 WARRANTY

- A. Provide a manufacturer’s 25-year end-to-end warranty on the structured cabling system.
- B. Warranty period is to commence from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. General Requirements: Comply with TIA/EIA-569-C:
 - 1. Cable Support: NRTL labeled for support of Category 6A cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - 2. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 3. Lacing bars, spools, J-hooks, and D-rings.
 - 4. Straps and other devices.

2.2 CABLE TRAYS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide cable trays by CPI Chatsworth Products Inc. or comparable product by one of the following:
 - 1. Cablofil by Legrand North America, LLC.
 - 2. Panduit Corp.
 - 3. Or approved equal.



- B. Used in the Main cross connect (MC), equipment rooms (ER), horizontal cross connect (HC) and related distributors to support the incoming Horizontal Cabling and other cables within the rooms
- C. Provide and install all straight sections, vertical and horizontal, 90° bends. T- and cross sections, and all accessories as shown on the Contract Documents. Additionally, provide and install all necessary hardware to allow a seamless transition between the outside and the inside of the MDF and IDFs:
 - 1. Aluminum construction
 - 2. Color: Black
 - 3. Width: 24" as shown in the Contract Documents. Rung Spacing: 9"
- D. Provide and install 12" threaded rod covers for each piece of threaded rod that supports the tray and racks.
- E. Provide and install 6" cable retaining post for the cable tray:
 - 1. Height 6"
 - 2. Color: Black
 - 3. Use a 2' intervals
- F. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceways and Boxes for Electrical Systems."
 - 1. Outlet boxes must be Double gang standard electrical back box.

2.3 TELEPHONE TERMINAL BACKBOARDS

- A. The following equipment is required in the Telephone Room and each Telephone Closet:
 - 1. Two (2) Plywood panels, 3/4" x 4' x 6' fire rated affixed to 2" x 4" studs spaced 2' on center.

2.4 110-STYLE WIRING BLOCKS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide 110-style wiring blocks by Leviton or comparable product by one of the following:
 - 1. Ortronics
 - 2. Belden
 - 3. Or approved equal



- B. Note that all cabling must be from a single-source solution with no mixing of manufacturers.
- C. Category 6 110 blocks complete with C4 clips are to be used for all Cat 6 voice backbone cable terminations. All pairs must be terminated and tested for Category 6 compliance.
- D. Category 6A 110 blocks complete with C4 clips are to be used for all Cat 6A voice horizontal cable terminations. All pairs must be terminated and tested for Category 6A compliance.
- E. Horizontal 110 cross connect wire managers are to be installed above and below 110 blocks.

2.5 COPPER PATCH PANELS, CATEGORY 6A

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Copper Patch Panels by Leviton or comparable product by one of the following:
 - 1. Ortronics
 - 2. Belden
 - 3. Or approved equal
- B. Note that all cabling must be from a single-source solution with no mixing of manufacturers.
- C. Copper patch panels must be used for termination of all Category 6A horizontal cable run.
 - 1. Number of Cat 6A Patch Panels is determined by station count, plus 25%
- D. Racks and Cable Channels for patch panels must be open type, floor mounted 23.75" wide x 84" high, constructed of sturdy lightweight aluminum.
- E. Provide 3' Blue Data Patch Cords for data closet connection, quantity to match the number of data ports required. (Deliver Patch Cords to the Commissioner upon acceptance of installation.)

2.6 FIBER OPTIC SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide fiber optic system by Leviton or comparable product by one of the following:
 - 1. Ortronics
 - 2. Belden



3. Or approved equal
- B. Note that all cabling must be from a single-source solution with no mixing of manufacturers.
- C. Optical Patch Panel must be 19" rack mountable suitable for supporting termination of OM3 fiber optic cables and LC duplex connectors.
 1. Fiber strands must terminate with LC pre polished OM3 connectors.
 2. Include one, 12 strand multimode LC adapter plate for each 12 strand cable termination, Aqua color for Laser optimized channels.
- D. Provide duplex 1 meter LC-LC OM3 fiber optic patch cords for backbone data connections. Quantity to match the number of data ports required.

2.7 CATEGORY 6A/FIBER/COAX CABLING

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Category 6A/Fiber/Coax cabling by Leviton or comparable product by one of the following:
 1. Ortronics
 2. Belden
 3. Or approved equal
- B. Note that all cabling must be from a single-source solution with no mixing of manufacturers.
- C. Provide, (1) 4 pair (8 conductor), 23 AWG, Category 6A, unshielded twisted copper pair 100 Ohm, (GREEN) plenum rated, station wire runs for voice application, from telephone room/closets to station locations designated on floor plans.
- D. Provide, (1) 4 pair (8 conductor), 23 AWG, Category 6A, unshielded twisted copper pair 100 Ohm, (VIOLET) plenum rated, station wire runs for data, from telephone room/closets to station locations designated on floor plans.
- E. The color of the station wire run jackets should be different for each application i.e., "VIOLET" cable for Data, "GREEN" cables for Voice.
- F. Riser cables for voice are to be Category 6 compliant, Unshielded sized to provide for 25% spare pairs.
- G. Coax, RG6 Quad shield plenum rated (only to specific locations as indicated in drawings) Run will consist of work station to telephone room/closet. No riser is needed. No patch panel is required.



- H. Riser cable for data is to be fiber optic, Laser Optimized OM3 12 strand 50micron multimode, plenum rated, armored premise style (type OFCP).

2.8 WORK STATION OUTLETS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide work station outlets by Leviton or comparable product by one of the following:
 - 1. Ortronics
 - 2. Belden
 - 3. Or approved equal
- B. Note that all cabling must be from a single-source solution with no mixing of manufacturers.
- C. Category 6A, 8 conductor, 8 position, RJ-45 will be used for both data and voice station jacks for locations designated on floor. Upper jack position will be used on duplex wallplate/faceplate for voice. Provide two data jacks and one voice jack per workstation location.
 - 1. Provide 15' Blue Data Patch Cords for data station connection, quantity to match the number of data receptacles in the facility. (Deliver Patch Cords to the Commissioner upon acceptance of installation.)
 - 2. Provide 15' Green Voice Patch Cords for voice station connection, quantity to match the number of data receptacles in the facility. (Deliver Patch Cords to the Commissioner Unit upon acceptance of installation.)
- D. Station Wire Runs:
 - 1. Category 6A data lines will be terminated on, patch panels in the telephone room/closet.
 - 2. Voice lines will terminate on 110 blocks located on the wall in the telephone room/closet.
 - 3. Fiber lines will terminate on patch panels in the telephone room/closet.
 - 4. Coax lines will terminate in the telephone room/closet with 20' (feet) of spare cable provided.
- E. All jacks are to be addressed (voice and data, separately) using the manufacturers faceplate window. Address nomenclature will be as directed by The Commissioner during shop drawing submission.

2.9 UNINTERRUPTIBLE POWER SUPPLY



- A. Basis-of-Design Product: Subject to compliance with requirements, provide uninterruptible power supplies by APC or comparable product by one of the following:
 - 1. Eaton
 - 2. Tripplite
 - 3. Or approved equal
- B. Provide one UPS in the Telephone Room.
- C. Provide one extended-run battery pack in the Telephone Room.

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify that field measurements are as shown on Drawings.
- C. Beginning of installation means installer accepts existing conditions.

3.3 INSTALLATION

- A. Provide labor and material to conform with accepted TIA/EIA category 6/6A specifications and telephone installation practices to wire and terminate station wire runs to appropriate station cross-connect blocks, patch panels and modular voice/data station jacks.
- B. This will include the installation of plywood backboards, wire spools, D-rings, tie wraps and cross connect wire as required.
- C. All station cross connect blocks, patch panels, station wire runs and modular voice/data station jacks must be appropriately marked, tagged and designated in the telephone room and at station locations.
- D. All station wire runs (all pairs) to be tested for continuity, polarity and category 6/6A compliance from the telephone room to each telephone closet and from each closet to each work station location.

3.4 INSTRUCTION MANUALS



- A. The Contractor must compile and provide five (5) copies complete manuals on the finished system to include: operating and maintenance instructions, manufacturer's catalog pages of all equipment and components, all as-built wiring and conduit diagrams (both floor plan and riser types) and a manufacturer's suggested spare parts list for to be distributed as directed by the Commissioner.

3.5 INSTRUCTION

- A. In addition to the above manuals, the Contractor must provide the services of a trained manufacturer's representative for a period of four (4) hours, during normal business hours, to instruct designated personnel on the operation and maintenance of the entire system.

END OF SECTION 27 10 00

SECTION 28 00 00 - ELECTRONIC SAFETY AND SECURITY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL CONDITIONS

- A. The work to be done under this section of the Specifications must include the furnishing of labor, material, equipment, and tools required for the complete installation of the work indicated on the Drawings, as specified herein, or as noted in other sections of Division 28 – Electronic Safety and Security.
- B. All materials, obviously a part of the electronic security infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, must be furnished and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one must be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher cost and/or higher level of functionality must be included to meet the design intent.
- D. The Work must include installation and commissioning of the following:
 - 1. Integrated Security Management system consisting of:
 - a. Video Surveillance System
 - b. Intercom System
 - 2. Wire and cable to install all equipment as specified herein
 - 3. Miscellaneous conduit and back boxes (not shown on the Documents as provided, but required for a complete installation).

1.3 RELATED SECTIONS

- A. 28 00 00 Electronic Safety and Security
- B. 28 05 00 Common Work Results for Electronic Safety and Security



- C. 28 14 00 Access Control System Hardware
- D. 28 20 00 Video Surveillance
- E. 28 21 00 Surveillance Cameras

1.4 REFERENCES

- A. All work must be in accordance with, but not limited to, the following:
 - 1. The National Electrical Code
 - 2. American National Standards Institute (ANSI)
 - 3. National Electrical Manufacturers Association (NEMA)
 - 4. Telecommunications Industries Association (TIA)
 - 5. Electronic Industries Association (EIA)
 - 6. Institute of Electrical & Electronics Consultants (IEEE)
 - 7. Underwriters Laboratories (UL)
 - 8. American Standards Association (ASA)
 - 9. Federal Communications Commission (FCC)
 - 10. Occupational Safety and Health Administration (OSHA)
 - 11. American Society of Testing Material (ASTM)
 - 12. Americans with Disabilities Act (ADA)
- B. In the event of conflicts, the more stringent provisions must apply.

1.5 DEFINITIONS

- A. Regardless of their usage in codes or other industry standards, certain words or phrases as used in the Documents for the Work, must be understood to have the specific meanings as ascribed to them in the following list:
 - 1. “Circuit” – Any specific run of circuitry
 - 2. “Circuitry” – Any Work which consists of wires, cables, raceways, and/or specialty wiring method assemblies complete with associated junction boxes, pull boxes, outlet boxes, joints, couplings, splices, and connections except where limited to a lesser meaning by specific description.



3. “Concealed” (as applied to circuitry) – Covered completely by building materials, except for penetrations (by boxes and fittings) to a level flush with the surface as necessitated by functional or specified accessibility requirements.
4. “Exposed” (as applied to circuitry) – Not covered in any way by building materials.
5. “Patch Panel” – A system of terminal blocks, patch cords, and backboards that facilitate administration of cross-connecting cables.
6. “Raceway” – Any pipe, duct, extended enclosure, or conduit (as specified for a particular system) which is used to contain wires and which is of such nature as to require that the wires be installed by a pulling in procedure. Where the word “conduit” is used without specific reference to type, it must be understood to mean “raceway”.
7. “Relocate existing” – Remove existing item from present location. Reinstall, reconnect, and test existing item and make ready for use at new location as indicated.
8. “Remove existing” – Remove existing item and return item to City of New York.
9. “Replace” – Remove existing item and return item to City of New York. Provide new item as indicated.
10. “Riser” – Must refer to the portion of the installation that transmits between building floors or between security system rooms; also referred to as “Backbone Cabling”.
11. “Security Closet” – The enclosed area or room specifically designated for the routing, termination, and/or cross connecting of security system cable to other security system cable and/or equipment.
12. “Security system Wiring” – see “Circuitry”.
13. “Security system Work” – See “Work”.
14. “Standard” (as applied to wiring devices) – Not of a separately designated individual type.
15. “Wiring” – See “Circuitry”.

1.6 GUARANTEE SERVICE

- A. Provide a one year guarantee for the Work. The guarantee must cover all Work, systems, and subsystems against defects in materials and workmanship. The Work as specified herein, including all materials and labor, but excepting any existing devices and equipment which are incorporated in the completed Work, must be warranted to be free from defects in design, workmanship, and materials. Further, the Installer must warrant that the completed systems, including all components (except those, which are existing or provided by other trades), are of sufficient size and capacity to fulfill the requirements of the Specifications.



- B. The guarantee must be valid for a period of one year following the date of substantial completion.
- C. Guarantee Service:
 - 1. In the event that defects in the materials and/or workmanship are identified during the guarantee period, the Installer must provide all labor and materials as may be required for prompt correction of the defect.
 - 2. During the guarantee period, the Installer must, upon receipt of a request for service from the Commissioner, deploy service personnel to the City of New York's premises within four hours to initiate corrective action.
 - 3. All guarantee service and restoration work must be performed by personnel, who have been instructed, certified and is experienced in the operation and service of the installed system(s).
 - 4. Unless otherwise requested by the Commissioner, guarantee service must be performed during normal business hours, exclusive of Holidays.
 - 5. Guarantee service must include the replacement of all parts and/or components as required to restore normal system operation. In the event that system parts or components must be removed for correction, it must be the responsibility of the Installer to furnish and install temporary parts and/or components as required to restore normal system operation until the corrected parts or components can be corrected and re-installed.
 - 6. It must be the responsibility of the Installer to maintain an inventory of spare parts or to arrange for manufacturer parts support as required ensuring correction of all critical component failures or malfunctions within 48 hours of the Commissioner's request for service. Critical parts must be defined as those, which govern or affect the normal operation of more than one field device.
 - 7. The Installer's guarantee obligation must include correction of any software/firmware defects, which may be identified during the guarantee period. Any failure of the software/firmware to perform as specified by the software/firmware manufacturer at the time of final acceptance must be defined as a software/firmware error.
 - 8. Immediately following the completion of a guarantee restore or service call, the Installer's service personnel must submit a written report to the City of New York which details the service work performed, the cause of the trouble, and any outstanding work which is required to restore complete and normal operation.
- D. The Installer must perform preventative service during the guarantee period as part of the guarantee service. The Installer must submit a list of items to be included in the preventative service program and the service to be performed.



- E. Include a manufacturer’s software service agreement as part of the Guarantee. This agreement must include all software updates, revisions, telephone service assistance, and instruction for any changes in operation.
- F. Provide written notice to the City of New York documenting any Work performed during the guarantee period, including any preventative service Work performed.
- G. Provide loaner equipment that is fully compatible with the SMS for any equipment not field correctable.
- H. Loaner equipment for components that must be shipped to/from the manufacturer or distributor must be on site and operational within 48 hours of the component failure. Furnish lists of equipment that will require shipment from the manufacturer or distributor and lead times associated with that equipment.
- I. Restore or Replacement Service:
 - 1. Restore or replacement service during the guarantee period must be performed in accordance with the following schedule:
 - a. Schedule A: 7 days, 24 hours per day with a four (4) hour response time
 - b. Schedule B: Normal business hours, excluding holidays, with a four (4) hour response time.
 - 2. Schedule A must apply for major system components including, but not limited to, the file servers, system workstations, control panels, intercom exchange and master stations, and any other components that would create security vulnerabilities if non-functional.
 - 3. Schedule B must apply for all other components and devices.
- J. Failure to Perform Service:
 - 1. Schedule A Components: The Installer must provide 14 days of additional total system guarantee (at no additional cost to the City of New York) for every two (2) consecutive days of system or device failure.
 - 2. Schedule B Components: The Installer must provide seven (7) days of additional total system guarantee (at no additional cost to the City of New York) for every two (2) consecutive days of system or device failure.
- K. Provide on-line software service and support during the guarantee period including all software and hardware.

1.7 SUBMITTAL PROCEDURES



- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.8 SUBMITTALS

- A. Submit for approval, details of all materials, equipment, and systems to be furnished. Work must not proceed without approval of the submitted items.
- B. General Description and Requirements:
1. Submit pre-fabrication submittals in accordance with the construction schedule.
 2. Pre-fabrication submittals must consist of product data, Shop Drawings, samples, and a detailed completion schedule. Partial submittals will not be accepted without prior written approval.
 3. No portion of the Work must commence nor must any equipment be procured until approval of the pre-fabrication submittals has been given in writing.
 4. A letter of transmittal identifying the name of the Project, Installer’s name, and date submitted for review must accompany pre-fabrication submittals along with a list of items transmitted.
- C. Product data required as part of the pre-fabrication submittal must include the following:
1. Equipment schedules listing all system components, manufacturer, model number and the quantity of each
 2. General functional descriptions for each system
 3. Manufacturer’s data specification sheets for all system components, including any guarantee information (sheets containing more than one device or component model number must be clearly marked to delineate items included in the Work)
 4. A complete list of cable and wiring types, sizes, manufacturer, and model number
 5. A complete list of finishes and sample graphics, including custom art work and custom graphics (if applicable)
 6. List of parts inventory to provide manufacturer recommended service and service of the Work.
- D. Shop Drawings must include the following:
1. Floor plan drawings indicating device locations with device legends
 2. System riser diagram with all devices, wire runs, and wire designations



3. Schematic block diagrams for each system showing all equipment, interconnects, data flow, etc.
 4. Wiring diagrams for each subsystem defining the interconnection of all inputs and outputs for all equipment
 5. Wiring diagram for fail-safe release of electric locking mechanical
 6. Fabrication Shop Drawings for all custom equipment (if applicable)
 7. Plans and elevations of the security console(s) and equipment racks quantifying all equipment to be mounted therein
 8. Elevations of security closet layouts showing panel locations, power supply locations, conduit, wire ways, wire molds, and all other equipment
 9. Submit samples of any equipment components upon request.
 10. Samples submitted must be the latest version of equipment.
 11. It is the responsibility of the Installer to confirm all dimensions, quantities, and the coordination of materials and products supplied by the Installer with other trades. Approval of Shop Drawings containing errors does not relieve the Installer from making corrections at their expense.
 12. Submittals for individual systems and equipment assemblies that consist of more than one item or component must be made for the system or assembly as a whole. Partial submittals will not be considered, reviewed, or stored and such submittals will not be approved.
 13. Shop Drawings must include equipment racks, patch panels, termination blocks, connection details, rack mounting details, and any other details not included in the Construction Drawings.
- E. Any materials and equipment listed that are not in accordance with Specifications requirements may be rejected.
- F. The approval of material, equipment, systems, and Shop Drawings is a general approval subject to the Drawings, Specifications, and verification of all measurements at the job. Approval does not relieve the responsibility of shop drawing errors. Carefully check and correct all Shop Drawings prior to submission for approval.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials used in this work must be new and must bear the inspection label of Underwriters Laboratories Inc. or certification by other recognized laboratory as required.



- B. The published standards and requirements of the Telecommunications Industries Association (TIA), National Electrical Manufacturers Association (NEMA), the American National Standard Institute (ANSI), the Institute of Electrical and Electronic Consultants (IEEE), and the American Society of Testing Materials (ASTM), are made a part of these Specifications and must apply wherever applicable.
- C. Materials and equipment furnished must be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts are available.
- D. When more than one unit of the same class of equipment or material is required, such units must be the products of a single manufacturer or partner manufacturers that offer a certified solution.
- E. Components of an assembled unit need not be products of the same manufacturer, but must offer a certified end-to-end solution.
- F. Manufacturers of equipment assemblies, which include components made by others, must assume complete responsibility for the final assembled unit.
- G. Components must be compatible with each other and with the total assembly for the intended service.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 LANGUAGE USAGE

- A. English language must be used throughout the security system, signage, labels, voice messages, instructions, manuals, software, and graphic displays.

3.3 EXAMINATION OF CONDITIONS

- A. Prior to the start of work, carefully inspect the installed work of other trades and verify that such work is complete to the point where installation may properly commence. Start of work indicates acceptance of conditions.
- B. Install equipment in accordance with applicable codes and regulations, the original design intent, and the referenced standards.
- C. In the event of a discrepancy, immediately provide notification notify the Commissioner.
- D. Do not proceed with installation until unsatisfactory conditions and discrepancies have been fully resolved.

3.4 PROTECTION OF SYSTEMS AND EQUIPMENT



- A. Protect materials and equipment from damage during storage at the site and throughout the construction period. Equipment and materials must be protected during shipment and storage against physical damage, dirt, theft, moisture, extreme temperature, and rain.
- B. Damage from rain, dirt, sun, and ground water must be prevented by storing the equipment on elevated supports and covering the sides with securely fastened protective rigid or flexible waterproof coverings.
- C. During installation, equipment must be protected against entry of foreign matter on the inside and be cleaned both inside and outside before testing, operating, or painting.
- D. As determined by the Commissioner, damaged equipment must be fully corrected or must be removed and replaced with new equipment to fully comply with requirements of the contract documents. The decision of the Commissioner must be final.
- E. Damaged paint on equipment and materials must be repainted with painting equipment and finished with the same quality of paint and workmanship as used by the manufacturer.

3.5 ACCESS TO EQUIPMENT

- A. Equipment must be installed in location and manner that will allow convenient access for service and inspection.
- B. Working spaces must be not less than specified in the National Electrical Code (NEC) for voltages specified.
- C. Where the Commissioner determines that the installed equipment is not conveniently accessible for operation and service, equipment must be removed and reinstalled, one time only, as directed by the Commissioner, at no additional cost. “Conveniently accessible” is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping, and duct work, except where required by design or intent.

3.6 INSTALLATION

- A. The Installer must carefully follow the instructions in the manufacturers’ Installation Manual to ensure all steps have been taken to provide a reliable, easy to operate system.
- B. The Administrator Terminal must be connected to the remote terminals before connecting to any card reader processors.
- C. Perform all Work as indicated in the Drawings and Specifications.
- D. The Installer must install the appropriate cable from the CPU to readers, door contacts, request-to-exit devices, and electric locks at each door and/or gate.
- E. All communications cables must be kept away from power circuits.



- F. The Installer must install the power supply(s) for electric locks in locations where they won't interfere with other operations.
- G. The Installer must also execute adequate testing of the system to ensure proper operation.
- H. The Installer must provide adequate instruction of the system users to ensure adequate understanding to prevent operating errors.

3.7 WORKMANSHIP

- A. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform Work with persons experienced and qualified to produce workmanship specified.
- C. Maintain quality control over suppliers and Subcontractors.
- D. Quality of workmanship is considered important. Commissioner will have the authority to reject Work which does not conform to the Drawings and Specifications.

3.8 EQUIPMENT PRE-TEST

- A. All equipment must be bench tested as per manufacturer's instructions prior to delivery to job site and prior to installation.

3.9 WIRE AND CABLE

- A. Design, layout, size, and plan new wire and cable runs as required.
- B. All wire and cable from the processors to all devices at each door must be "home-run" unless otherwise specified.
- C. All wire and cable, including any wire and cable that is existing and will be reused in the Work, must be installed in conduit or surface metal raceway, except as follows:
 - 1. Wire or cable, in lengths of less than ten (10) feet, that is "fished" within walls, ceilings, and doorframes.
- D. All wire and cable passing thru metalwork must be sleeved by an approved grommet or bushing.
- E. Avoid splicing conductors. All splices must be made in junction boxes (except at equipment). Splices must be made with an approved crimp connection. Wire nuts must not be used on any low-voltage wiring. Where necessary, provide heat-shrink to insulate all wire splices and connections. The use of electrical tape for splices and connections must not be acceptable.



- F. Identify all wire and cable at terminations and at every junction box. Identification must be made with an approved permanent label, or equal.
- G. Furnish and install all SMS wire and cable with the exception of traveling cable for elevator control and monitoring.
- H. Coordinate the protection and routing of wire and cable requiring isolation from power, radio frequency (RF), electromagnetic interference (EMI), telephone, etc. with the Commissioner.
- I. Run all wire and cable continuous from device location to the final point of termination. No mid-run cable splices must be allowed.
- J. Wire and cable within ICs, power distribution cabinets and other security enclosures must be neatly installed, completely terminated, pulled tight with slack removed and routed in such a way as to allow direct, unimpeded access to the equipment within the enclosure. All wire and cable must be bundled and tied.
- K. Provide heat-shrink to insulate all wire splices and connections. The use of electrical tape for splices and connections must not be acceptable.
- L. Visually inspect all wire and cable for faulty insulation prior to installation.
- M. Provide grommets and sinstruct relief material where necessary to avoid abrasion of wire and excess tension on Wire and Cable.
- N. Make connections with solder-less devices, mechanically and electrically secured in accordance with the manufacturers' recommendations. Wire nuts must not be an acceptable means of connecting wire and cable.
- O. Neatly bundle and wrap all horizontally run (above accessible ceilings and not within conduit) wire and cable at three-meter intervals. Provide supports as required. All supports must be UL listed for the application.
 - 1. All System wiring within vertical riser shafts (as required) must be bundled, wrapped and tied to the structure at three-meter intervals in order to isolate it from other wire and cable within the shaft. Additionally, all wire and cable within the shaft must be supported at least every two floors. Provide all personnel and equipment necessary to install and support the cable. All equipment must be UL listed for the application.

3.10 CONDUIT AND RACEWAY INSTALLATION

- A. Design, lay-out, size and plan new conduit and raceway systems as required.
- B. Cabling must be installed in conduit under any of the following conditions:
 - 1. Where required by code
 - 2. Where cabling traverses unsecure, public space



3. Where cabling would otherwise be exposed to tampering or vandalism.
- C. No exposed conduit must be installed within public areas unless approved by Commissioner.
- D. Indoor Requirements:
1. Route exposed conduit and raceway parallel and perpendicular to walls and adjacent piping.
 2. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps.
 3. Use conduit bodies to make sharp changes in direction, as around beams. Fasten conduits and raceways to structural steel using approved spring clips or clamps.
 4. Where conduit penetrates fire-rated walls and floors, seal opening with UL listed fire rated sealer.
 5. No exposed conduit, raceway, or junction box must be installed within any office area.
 6. Install all boxes straight and plumb.
 7. Do not support conduit from mechanical, plumbing, or fire sprinkler systems.
 8. Drill or core drill all holes in walls, ceilings, or floors where required for new conduits. Do not cause damage to any structural steel or other structural support member by drilling or cutting.
 9. Do not use flexible conduit in lengths longer than six (6) feet.
- E. Outdoor Requirements:
1. In locations where conduit penetrates exterior walls, seal opening around conduit in an approved manner to make watertight.
 2. Use galvanized straps and fasteners on all exterior conduit.
 3. All exterior boxes will only be used to aid in pulling the cable between points.

3.11 PENETRATIONS

- A. Do not penetrate any roof, flashing, exterior wall, or parapet without prior approval from the Commissioner.
- B. When penetrating a fire wall for passage of cables and/or conduit, always provide a fire-stop system.

3.12 FIRE RATED DOORS AND FRAMES

- A. Do nothing to modify a UL-rated door or frame that would void the UL-label or fire rating.

3.13 GROUNDING

- A. Provide earth-grounding of equipment as required by equipment manufacturer. Earth ground must be connected to ground rod or approved cold water pipe. Electrical or telephone ground connections must not be used as earth grounds. Connections to mounting posts or building structural steel must not be used as earth grounds.

3.14 POWER TO SECURITY EQUIPMENT

- A. Power all equipment from circuits dedicated for security use, except as noted. Mark all panel circuit breakers with labels worded “Security Equipment - Do Not Operate”, or equivalent.
- B. All plug-in transformers must be located at the security control panels. Secure all low-voltage plug-in transformers to outlet with screw or strap. Clearly label all transformers to identify purpose and use.
- C. AC power dedicated to security and on generator backup must be provided for the Security System as indicated on the Documents. Coordinate with the Commissioner to establish locations of dedicated AC circuits.
- D. Connect to the AC power and provide UL listed power supplies and transformers to distribute low voltage power to the System components as required.
- E. Provide hinged cover terminal cabinets with tamper switches for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the AC power facilities to the terminal cabinets.
- F. Surge Protection:
 - 1. Provide protection against spikes, surges, noise, and other line problems for all System equipment and components.
 - a. Protect all exterior video, control, power, signal cables, and conductors against power surges. Video surge protectors must not attenuate or reduce video and sync signals under normal conditions. Each surge protector must be UL Listed.

3.15 CUTTING AND PATCHING

- A. The Installer must be responsible for all cutting, fitting, or patching that may be required to complete the Work.

3.16 PAINTING

- A. All surface raceway systems must be painted to match the surfaces they are attached to:

3.17 PLYWOOD BACKING

- A. Install the processor(s), power supplies, and all other related equipment on a plywood backboard for testing in the shop. The mounted assembly will then be transported “as is” to the job site for mounting in the Communication Room.
- B. Fasten the plywood backing to the wall using a hanger bolt at the four corners which align with pre-drilled holes in the plywood. Secure with flat washers and a nut.

3.18 CLEANING

- A. During construction, and prior to acceptance of the building, remove from the premises and dispose of packing material and debris caused by electronic security work.
- B. Remove dust and debris from interiors and exteriors of electrical equipment. Clean accessible current carrying elements prior to being energized.

3.19 MANUFACTURER PROFESSIONAL SERVICES

- A. Installer must coordinate with the manufacturer to provide the manufacturer’s professional services team to assist in coordinating the interfaces between the security management system and other on-site systems as necessary.
- B. Professional Services personnel must be employed by the manufacturer of the security management system and must be thoroughly knowledgeable of the security management system applications.
- C. Professional Services personnel must be on-site and available to meet for a period of not less than two consecutive days.

3.20 SYSTEM START-UP

- A. The Work must be complete and ready to operate prior to final acceptance.
- B. Load the entire initial user database into all programmable systems up to the day of beneficial use of the system. Coordinate with the Commissioner to establish procedural guidelines and in defining terminology and conditions unique to the City of New York’s operation.

3.21 SYSTEM ACCEPTANCE

- A. Final acceptance testing of the Work will be conducted by the Commissioner.
- B. Prior to any final acceptance testing, the Installer must submit two (2) sets of preliminary Record Drawings to the Commissioner. The preliminary Record Drawings are to be used by the Commissioner to conduct the system final test.



- C. Conduct a complete test of the entire system and provide the Commissioner with a written report on the results of that test. During the course of this test, place the integrated system in service and calibrate and test all equipment.
- D. Fully complete a Security Systems Readiness Checklist prior to the test of the system. The checklist must accompany the written certification to the Commissioner that the installed complete system has been calibrated, tested, and is fully functional as specified herein.
- E. Following completion of the initial testing and correction of any noted deficiencies, conduct a five (5) day burn-in test. The intent of the burn-in test must be to prove the system by placing it in near real operating conditions. During this period the system must be fully functional and programmed such that all points, interfaces, controls, reports, messages, prompts, etc. can be exercised and validated. Record and correct any system anomaly, deficiency, or failure noted during this period. Scheduling of the final acceptance test must be based on a review of the results of this burn-in test.
- F. Deliver a report describing the results of functional tests, burn-in tests, diagnostics, calibrations, corrections, and corrects including written certification to the Commissioner that the installed complete system has been calibrated, tested, and are fully functional as specified herein.
- G. Prior to the final acceptance test, coordinate with the Commissioner for security related construction clean-up requirements. Security equipment closets and similar areas should be free of accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, remove all waste materials, rubbish, the Installer's and it's subcontractors' tools, construction equipment, machinery, and all surplus materials.
- H. Upon written notification from the Installer that the system is completely installed, integrated, and operational, and the burn-in testing completed, the Commissioner will conduct a final acceptance test of the entire system.
- I. During the final acceptance test by the Commissioner, the Installer must be responsible for demonstrating that, without exception, the completed and integrated system complies with the contract requirements. All physical and functional requirements of the project must be demonstrated and shown. This demonstration will begin by comparing "as built" conditions of the system to requirements outlined in the Specification, item by item. Following the Specification compliance review, all system head-end equipment will be evaluated.
- J. In order to sufficiently demonstrate the system's functionality, the console operator on duty and the operator superior may be requested to perform certain daily operations inherent to the system.
 - 1. As all of these operations depend heavily on the instruction outlined within the Specification, the Installer must have completed all of the required instruction prior to initiation of the final acceptance test.



- K. The functionality of all interfaces between systems will be tested.
- L. Following the system head-end equipment and console review, the installation of all field devices will be inspected. Areas examined will include general neatness and quality of installations, complete functionality of each individual device, and mounting, back box and conduit requirements compliance.
- M. All equipment must be fully operational during testing procedures. The Installer must provide all personnel, equipment, and supplies necessary to perform all site testing. A minimum of two (2) employee's familiar with the system for the final acceptance test must be present during the testing. One employee must be responsible for monitoring and verifying alarms while the other will be required to demonstrate the function of each device. Supply at least two (2) two-way radios for use during the test. A manufacturer's representative may be present on site to answer any questions that may be beyond the technical capability of the Installer's employees, if the Installer so elects or by specific request of the Commissioner at no charge to the City of New York.
- N. Upon successful completion of the final acceptance test (or subsequent punch list retest) the Commissioner will issue a letter of final acceptance.
- O. The Commissioner retains the right to suspend and/or terminate testing at any time when the system fails to perform as specified. In the event it becomes necessary to suspend the test, the Installer must work diligently to complete/correct all outstanding items to the condition specified in Documents. The Installer must supply the Commissioner with a detailed completion schedule outlining phase-by-phase completion dates and a tentative date for a subsequent punch list retest. During the final acceptance test, no adjustments, corrections or modifications to the system will be conducted without the permission of the Commissioner.

3.22 INSTRUCTION

- A. Installer must provide complete operator instruction on the security system. Hands-on instruction must include the opportunity for each person to operate the system, and to practice each operation that an operator would be expected to perform.
- B. Instruction must cover all operating features of the system for access control, video surveillance and enrolling user credentials.
- C. Provide a minimum of 16 hours of VSS System operator instruction either on or off site on a complete and fully operational System parallel and equal to the System being provided, to the City of New York staff.
- D. Operator instruction must include, but not be limited to the following:
 - 1. All system operation procedures.
 - 2. System configuration
 - 3. Manual and automatic camera call-up procedures



4. Video digital matrix functionality
 5. Recording retention days and FPS changes.
- E. Administrative instruction must include, but not be limited to the following:
1. System operation and configuration variables
 2. Manual and automatic camera call-up procedures
 3. Video matrix set up, configuration variables, and functionality

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SECTION 28 05 00

COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

- A. The work to be done under this section of the Specifications must include the furnishing of labor, material, equipment, and tools required for the complete installation of the work indicated on the Drawings, as specified herein, or as noted in other sections of Division 28 – Electronic Safety and Security.
- B. All materials, obviously a part of the electronic security infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, must be furnished and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one must be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher cost and/or higher level of functionality must be included to meet the design intent.

1.3 RELATED SECTIONS

- A. 28 00 00 Electronic Safety and Security
- B. 28 14 00 Access Control System Hardware
- C. 28 20 00 Video Surveillance
- D. 28 21 00 Surveillance Cameras

1.4 WORK INCLUDED

- A. The scope of work for this project must include systems and infrastructure for the security systems, which must include cabling, back boxes, conduit and equipment. Refer to electrical specifications for installation of the security system infrastructure (conduit & power). The Integrated Security Management System must consist of:



1. Intercom System.
2. Video Surveillance System.
3. Wire and cable to install all equipment as specified herein
4. Miscellaneous conduit and back boxes (not shown on the Documents as provided, but required for a complete installation)

PART 2 PRODUCTS

2.1 GENERAL

- A. All products not provided by the City of New York must be new and unused, and must be of manufacturers' current and standard production.
- B. Where two or more equipment items of the same kind are provided, all must be identical and provided by the same manufacturer.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor must provide all components needed for complete and satisfactory and intended operation.
- D. Product Availability
 1. Contractor, must determine product availability and delivery time, and must include such considerations into the proposed Contract Time.
 2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor must verify ability to procure the products specified prior to submitting a proposal.
- E. Wire and Cable
 1. General: Provide all wire and cable required to install systems as indicated. Wire and cable must be sized to provide minimum voltage drop and minimum resistance to the devices being supplied.
 2. All cables must be specifically designed for their intended use (direct burial, aerial, etc.).
 3. Comply with equipment manufacturers recommendations for wire and cable size and type.
 4. Comply with all applicable codes and ordinances.



F. Conduit and Raceway Systems

1. General: The placing of surface mounted conduit on the exterior of any building must be approved by Commissioner prior to its installation.
2. Interior Conduit:
 - a. Electrical Metallic Tubing (EMT)
 - b. Flexible Metal Conduit
 - c. Provide fittings and connectors as required for installation of EMT or flexible conduit.
3. Surface Raceways: Sheet metal channel with fitted cover, suitable for use as surface metal raceway, WIREMOLD, Legrand, Connect Track, or approved equal.
 - a. Provide fittings, elbows, and connectors designed for use with raceway system.
4. Exterior Conduit: (any of the following as determined by local code requirements):
 - a. Rigid Steel Conduit
 - b. Rigid Aluminum Conduit
 - c. Rigid Nonmetallic Conduit (only if buried 18" below ground surface).
 - d. Intermediate Metal Conduit
 - e. Provide rain-tight fittings and connectors as required for installation of exterior conduit.
5. Exterior Flexible Conduit:
 - a. Liquid-tight Flexible Conduit: Flexible metal conduit with PVC jacket.
 - b. Provide rain-tight fittings and connectors as required for installation of Liquid-tight Flexible Conduit.

G. Junction and Pull Boxes

1. Interior Boxes: Sheet Metal Outlet Boxes: Sizes to be determined in accordance with code requirements for conductor fill. Provide box covers as required.
2. Exterior Boxes: All exterior boxes must NEMA 4 or NEMA 3R, water-tight and dust-tight



3. All interior and exterior boxes must have their covers fastened using security screws.

H. Lightning Protection

1. The Contractor must provide suitable lightning protection for all processors/controllers.
2. All lightning protection equipment must be UL listed.

2.2 WIRE AND CABLE

A. General Requirements:

1. Provide wire and cable as required to install the Security System as indicated on the Drawings and specified herein.
2. All wire and cable must be Underwriter's Laboratories (UL) listed, and must meet all national, state, and local code requirements for its application.
3. All wire and cable must meet individual system or subsystem manufacturer Specifications.
4. All wire and cable must be Plenum type cable and must conform to the minimum requirements of Insulated Cable Engineers Association (ICEA) Standards.
5. Wire and cable must comply with the applicable requirements of the National Electrical Code (NEC), latest edition, in regards to cable construction and usage.
6. The conductors of wires must be copper, and have conductivity in accordance with the standardization rules of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The conductor and each strand must be round and free of kinks and defects.
7. All cable carrying data or voice transmissions must be shielded. All other cable must be shielded where necessary for interference-free signals.
8. Insulation must be rated for a minimum of 300V.
9. Color-coding must be accomplished by using solidly colored insulation. Grounding conductors, where insulated, must be colored solid green or identified with green color as required by the National Electric Code (NEC).

B. Wire Types and Sizes

1. Signal Cable (Non-Power): Wire size must be a minimum of 20 AWG, twisted, shielded, stranded, insulated, and jacketed.



2. Signal Cable (Low Voltage Power): Wire size must be a minimum of 18 AWG, stranded, insulated, and jacketed.
 - a. Wire size must be a minimum of 18 AWG, twisted, stranded, insulated and jacketed and must be used for cable runs less than 500 feet.
 - b. Wire size must be a minimum of 16 AWG, twisted, stranded, insulated and jacketed and must be used for cable runs in excess of 500 feet, but less than 750 feet.
 - c. Wire size must be a minimum of 14 AWG, twisted, stranded, insulated and jacketed and must be used for cable runs in excess of 750 feet, but less than 1,250 feet.
3. Composite Access Control Cable Jacketed:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide products by Belden or comparable product by one of the following:
 - 1- Westpenn
 - 2- Southwire
 - 3- or Approved Equal
 - b. Wire size must have the minimum of
 - c. Lock Power: 4C 18 AWG, shielded
 - d. Card Reader: 3TP 22 AWG, OAS
 - e. Door Contact: 2C 22 AWG, Shielded
 - f. Rex/Spare: 4C 22 AWG, Shielded
4. Magnetic Contact Cable:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide products by Belden or comparable product by one of the following:
 - 1- Westpenn
 - 2- Southwire
 - 3- or Approved Equal
 - b. Wire size must have the minimum of
 - c. Door Contact: 2C 22 AWG, Shielded (Single Door MC-1)



- d. Door Contact: 4C 22 AWG, Shielded (Single Door MC-2)
- 5. Security IP Network Cabling
 - a. Must be provided by the Telecommunications trade under Division 27.
 - b. Must consist of (4) twisted pairs, 24 AWG or greater.
 - c. Must be Category 6 Augmented cabling (CAT 6A).
 - d. Refer to Div-27 Communications Specifications.
- 6. IP Network Patch Cables for Security Equipment
 - a. Provide patch cables for network connectivity within Security Equipment Rooms and where necessary in order to complete the Security System Work.
 - b. Must consist of (4) twisted pairs, 24 AWG or greater.
 - c. Must be Category 6 Augmented cabling (CAT 6A).
 - d. Refer to Div-27 Communications Specifications.
- 7. Fiber Optic Cable – Exterior Pole Cameras
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide products by Belden or comparable product by one of the following:
 - 1- Westpenn
 - 2- Southwire
 - 3- or Approved Equal
 - b. Provide patch cables for network connectivity from the IT room to each Pole Mounted camera.
 - c. Must be single mode.
 - d. Must be outdoor rated.
 - e. Connectors must be compatible with FO media convertor.



PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. Provide necessary work as detailed on Section 28 00 00.

3.3 EQUIPMENT

- A. Provide equipment as indicated on the Documents and specified herein. Additional specific installation requirements are as follows:
 - 1. Security Equipment Room and IC Locations
 - a. Configure security equipment as indicated in the Documents.
 - b. Wire all power supply power fail alarm contacts in each equipment room as a single alarm input to the SMS.
 - c. Wire each power supply low battery alarm contact as individual alarm inputs to the SMS.
 - 2. Electric Locking Mechanisms
 - a. Interface with electric locking mechanisms provided by the door hardware supplier.
 - b. Wire electric locking mechanisms as indicated on the Documents.
 - c. Wire fail-safe electric locking mechanisms in accordance with local codes.
 - d. Wire fail-secure electric locking mechanisms and power supplies such that a fire alarm condition or building power failure must not affect operation of the lock.
 - 3. Fire Alarm Interface
 - a. Connect (hard wire) fail-safe electric and time delay locking mechanical to the building fire alarm System for fail-safe release upon any fire alarm.



- b. Interface with a single low voltage/low current normally closed dry contact from the fire alarm System provided by the fire alarm contractor in the Fire Command Center. The contact must open on any fire alarm condition.
- c. Provide all additional UL listed fail-safe relays and power supplies necessary to interface to this contact and unlock all fail-safe doors.
- d. Connect fail-safe relays and power supplies to standard building power. Connection of fail-safe devices to emergency or UPS power must not be acceptable.

END OF SECTION 28 05 00

SECTION 28 08 00 COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This section includes commissioning process requirements for Electronic Safety and Security systems, assemblies, and equipment.
- B. Related Sections:
1. DDC General Conditions – Section 01 91 13 “General Commissioning Requirements for MEP Systems.”

1.3 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the City of New York with an unbiased, objective view of the system’s installation, operation and performance. This process does not eliminate or reduce the responsibility of the Contractor to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the City of New York.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the Contractor.
 2. Verify and document proper performance of equipment and systems.
 3. Verify that Operation & Maintenance documentation is complete and transferred to the City of New York.
 4. Verify that the City of New York’s maintenance personnel are adequately instructed.
- C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance checkouts.
- D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx activities with the Commissioner and Contractor.
- E. The Cx process shall not reduce the responsibility of the Contractor to comply with the Contract Documents.

1.4 SUBMITTAL PROCEDURES



- A. Refer to the DDC General Conditions Section 01 33 00 “Submittal Procedures.”
- B. In addition, provide the following:
 - 1. Certificates of readiness
 - 2. Certificates of completion of installation, prestart, and startup activities.
 - 3. O&M manuals
 - 4. Test reports

1.5 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: The Contractor will comply with test equipment manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.6 COORDINATION

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. The Contractor shall provide all standard testing equipment for the electrical systems and controls systems in Division 28. The Contractor shall ensure a sufficient quantity of two-way radios are provided.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.
- C. The Contractor shall ensure that proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems
- B. Red-lined Drawings:
 - 1. The Contractor will verify all equipment, systems, instrumentation, wiring and



components are shown correctly on red-lined drawings.

2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 4. The Contractor will create the as-built drawings.
- C. Operation and Maintenance Data:
1. The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
 2. The CxA will review the O&M literature once for conformance to project requirements.
 3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Instruction:
1. The Contractor will provide demonstration and instruction as required by the Contract Documents.
 2. A complete instruction plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any instruction.
 3. An instruction agenda for each instruction session must be submitted to the CxA one (1) week prior the instruction session.
 4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and the Commissioner. A copy of the test record shall be provided to the CxA and the Commissioner.
 5. Engage a Factory-authorized service representative to instruct the City of New York's maintenance personnel to adjust, operate, and maintain specific equipment.
 6. Instruct the City of New York's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
 7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests as per the written procedure and at the direction of the CxA.
- B. Attend construction phase controls coordination meetings.
- C. Participate in Electronic Safety and Security systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- D. Provide information requested by the CxA for final commissioning documentation.
- E. Include requirements for submittal data, operation and maintenance data, and instruction in each purchase order or sub-contract written.
- F. Prepare preliminary schedule for Electronic Safety and Security system orientations and inspections, operation and maintenance manual submissions, instruction sessions, equipment start-up and task completion for the City of New York. Distribute preliminary schedule to commissioning team members.



- G. Update schedule as required throughout the construction period.
- H. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for all commissioned equipment.
- I. Perform all verification and functional performance tests in the presence of the CxA as required.
- J. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.
- K. Gather operation and maintenance literature on all equipment and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.
- L. Coordinate with the CxA to provide 72-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
- M. Notify the CxA a minimum of two weeks in advance for start of the testing work.
- N. Participate in, and schedule vendors and subcontractors to participate in the instruction sessions.
- O. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
- P. The Contractor shall ensure that the equipment suppliers shall document the performance of the equipment.
- Q. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.
- R. Provide instruction to the City of New York’s maintenance personnel using expert qualified personnel, as specified.
- S. Contractor shall direct equipment suppliers to:
 - 1. Provide all requested submittal data, including detailed start-up procedures and specific requirements needed to keep warranties in force.
 - 2. Assist in equipment testing.
 - 3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- T. Refer to the DDC General Conditions Sections “General Commissioning Requirements for MEP Systems” for additional Contractor responsibilities.

3.3 CxA'S RESPONSIBILITIES

- A. Refer to the DDC General Conditions Section 01 91 13 “General Commissioning Requirements for MEP Systems” for CxA’s responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the CxA that Electronic Safety and Security systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the CxA that Electronic Safety and Security instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract



Documents, and that pretest set points have been recorded.

- C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- C. Prepare detailed testing plans, procedures, and checklists for Electronic Safety and Security systems, subsystems, and equipment with guidance from CxA.
- D. Tests will be performed using design conditions whenever possible, as determined by the Commissioner.
- E. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- F. The CxA may direct that set points be altered when simulating conditions is not practical.
- G. If tests cannot be completed because of a deficiency outside the scope of the Electronic Safety and Security system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.
- H. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.6 ELECTRONIC SAFETY AND SECURITY SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 28 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CxA.
- B. Fire Detection and Alarm System Testing: Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item, device and panel section to be tested.
- C. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The scope of commissioning work shall include but not limited to the following equipment and systems:



1. Fire Alarm System
2. Fire Alarm Control Panel
3. Fire Alarm Annunciation Panel
4. Smoke Detectors
5. Heat Detectors
6. Horns
7. Strobes Smoke Detectors
8. Manual Pull Stations
9. Elevator, Elevator Smoke Detectors and Recall Sequence
10. Fifteen (15) Security Cameras
11. Door Access Locks and Release upon fire detection

3.7 OPERATION AND MAINTENANCE MANUALS

- A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements.
- B. Refer to the DDC General Conditions Section 01 78 39 “Contract Record Documents” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for the Commissioner and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.8 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

- A. Refer to the DDC General Conditions Section 01 79 00 “Demonstration and Owner’s Pre-Acceptance Orientation” and Section 01 91 13 “General Commissioning Requirements for MEP Systems” for requirements pertaining to instruction.
- B. Contractor’s instruction responsibilities pertaining to Electronic Safety and Security work:
 1. Provide the CxA with an instruction plan four weeks before the planned instruction.
 2. Provide comprehensive instruction in the understanding of the systems and the operation and maintenance of each major piece of commissioned electronic safety and security equipment or system to City of New York’s maintenance personnel.
 3. Instruction shall be recorded by the CxA and start with classroom sessions, if necessary, followed by hands on instruction on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing subcontractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment is required. More than one party may be required to execute the instruction.



6. The instruction sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
7. Instruction shall include:
 - a. Use the printed installation, operation and maintenance instruction material included in the O&M manuals.
 - b. Include a review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The instruction shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.
 - c. Discuss relevant health and safety issues and concerns.
 - d. Discuss warranties and guarantees.
 - e. Cover common troubleshooting problems and solutions.
 - f. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
 - g. Discuss any peculiarities of equipment installation or operation.
 - i. Hands-on instruction shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance of all pieces of equipment.
 - ii. Fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.
 - iii. Instruction shall occur after functional testing is complete, unless approved otherwise by the Commissioner.

END OF SECTION 28 08 00

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SECTION 28 14 00 - ACCESS CONTROL SYSTEM HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

- A. The work to be done under this section of the Specifications must include the furnishing of labor, material, equipment, and tools required for the complete installation of the work indicated on the Drawings, as specified herein, or as noted in other sections of Division 28 – Electronic Safety and Security.
- B. All materials, obviously, a part of the electronic security infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, must be furnished and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one must be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher cost and/or higher level of functionality must be included to meet the design intent.

1.3 RELATED SECTIONS

- A. 28 00 00 Electronic Safety and Security
- B. 28 05 00 Common Work Results for Electronic Safety and Security
- C. 28 20 00 Video Surveillance
- D. 28 21 00 Surveillance Cameras

1.4 WORK INCLUDED

- A. The Work must include installation and commissioning of the following:
 - 1. Security Equipment & Enclosures
 - 2. Wire and cable to install all equipment as specified herein
 - 3. Miscellaneous conduit and back boxes (not shown on the Documents as provided, but required for a complete installation).

1.5 SYSTEM DESCRIPTION



- A. The scope of work to be included in this contract does not necessarily include every item of work. The Contractor must supply and install items that meet the specified requirements of the construction documents. The Security Management System (SMS) Servers and Workstations must be furnished complete, installed, tested, and operational. The SMS is designed to secure the facility with the capability of expansion to and connection to the client network.
- B. Components:
 - 1. The Contractor must provide access control equipment as specified herein including but not limited to the following:
 - a. Power supplies
 - b. Enclosures

PART 2 PRODUCTS

2.1 ELECTRIFIED LOCKING MECHANISMS

- A. Electrified locking mechanisms must be provided by the door hardware trade in division 08 as indicated on the documents.
- B. The security system must interface with electrified locking mechanisms as indicated on the Documents.
- C. Provide fail-safe operation of electrified locking mechanisms as indicated by the door hardware trade in division 08 documents.
- D. Fail-secure locks must remain operational during a fire alarm condition or power failure.

2.2 LOCAL ALARM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Dortronics 7281-EA or comparable product by one of the following:
 - 1. SDC EA
 - 2. Kouba Systems
 - 3. or Approved Equal
- B. Provide LA for local monitoring of the secure status of doors as indicated on the security device drawings.
- C. The horn of the LA must provide for a local audible alarm activated whenever an unauthorized user opens a monitored door.
- D. The on-board timer use will be determined by the Commissioner.

- E. The LA must be conned to the door position switch.

2.3 MAGNETIC CONTACTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Nascom N1178C/STHS7281-EA or comparable product by one of the following:
 - 1. Sentrol
 - 2. Magnasphere
 - 3. or Approved Equal
- B. Provide magnetic door position switches to monitor the open/closed status of doors as specified herein and as indicated on the Documents.
- C. Concealed Door Position Switch:
 - 1. Minimum Specifications:
 - a. Gap: 1” (25mm)
 - b. Switch Type: SPST
 - c. Mounting: 1” (25mm) diameter hole in door and frame

2.4 ELECTRIFIED LOCKING MECHANISM POWER SUPPLY

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Altronix or comparable product by one of the following:
 - 1. Life Safety Power
 - 2. MG Electronics
 - 3. or Approved Equal
- B. Provide power supplies for all electric locking mechanisms as specified with the exception of those noted as having time-delay functions as defined by NFPA 101.
- C. Provide power supplies for all electric locking mechanisms (with the exception of fire stair doors). Fail-safe locking devices must unlock automatically under the following conditions:
 - 1. Any building fire alarm
 - 2. Loss of building power
 - 3. Failure of the power supply
- D. Provide battery chargers and batteries sufficient for four (4) hours of backup power for the connected load for all power supplies except those for fail-safe locks.



- E. Monitor low battery and power fail alarms for each power supply.
- F. Minimum Specifications:
 - 1. Type: UL Listed Class II power limited
 - 2. Input Voltage: 120VAC 60 Hz
 - 3. Output Voltage: 24 VDC
 - 4. Output Connections: Individually fused outputs to each lock
 - 5. Output Rating: 150% of actual connected load
 - 6. Battery: Sealed gel type
 - 7. Alarm Outputs: Low battery and power fail
 - 8. Enclosure: Steel enclosure with integral lock and tamper switch.

2.5 INTERCOMM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Aiphone JP series or comparable product by one of the following:
 - 1. Commend
 - 2. Axis 2N
 - 3. or Approved Equal
- B. Provide (1) Video Master Stations / (3) Video Sub-Stations / (1) Audio Sub-Stations as indicated in the documents.
- C. Cable must be per manufacturer's recommendation.
- D. Provide power supplies per manufacturer's requirements.
- E. Device symbol designations: VI-M – Video Master Station, VI-7 – Video Sub-station, IC-6 – Audio Sub-station

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements

3.2 GENERAL

- A. Provide necessary work as detailed on Section 28 00 00.

END OF SECTION 28 14 00

SECTION 28 20 00 - VIDEO SURVEILLANCE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

- A. The work to be done under this section of the Specifications must include the furnishing of labor, material, equipment, and tools required for the complete installation of the work indicated on the Drawings, as specified herein, or as noted in other sections of Division 28 – Electronic Safety and Security.
- B. All materials, obviously a part of the electronic security infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, must be furnished, and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one must be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher cost and/or higher level of functionality must be included to meet the design intent.

1.3 RELATED SECTIONS

- A. 28 00 00 Electronic Safety and Security
- B. 28 05 00 Common Work Results for Electronic Safety and Security
- C. 28 14 00 Access Control System Hardware
- D. 28 21 00 Surveillance Cameras

1.4 WORK INCLUDED

- A. This Section describes the facility video surveillance system, including installation of all, cameras, camera controllers, power supplies, wiring, conduit systems, and all other required appurtenances for a complete working system:
 - 1. The system as described must be installed, tested, and delivered in first class working condition. The system will include all required hardware, software, programming and wiring to accomplish the requirements of the specification and contract drawings.
 - 2. All materials furnished will be new and of the latest design available from a manufacturer who is engaged in the manufacture and sale of digital video surveillance systems. The manufacturer must have an installed base of similar systems as a reference.



3. While the contract documents identify the location and quantities of equipment for estimating purposes, the installation of all wiring (power, network, video, and control), field devices, and equipment will be based on the complete vendor's/manufacturer's wiring diagrams and equipment layouts as approved for this project. The Contractor, prior to installation, must submit the design documents for approval.
- B. The Contractor must provide a complete system design based on the requirements as set forth in the contract documents. Provide option for integration with the card access and security system.
- C. The IP-based system must leverage the facility IT network infrastructure for system communications in as much as possible.

1.5 SCOPE OF WORK

- A. The scope of work to be included in this section does not necessarily include every item; the contractor must provide required information prior to installation.
- B. The VSS must be live view only, video recording not required.
- C. The Security Video System must be an IP network based fully distributed digital video system.
- D. The system will utilize Local Area Networks as a transmission medium for video, configuration, as well as storage of all data. The system must provide full video control at the master control station, with additional full selection capability at any point within the network.
 1. Verification that proposed equipment and devices furnished are adequate and well suited for the intended purpose.
 2. Perform a layout check to ensure that adequate access is available for construction, installation, and maintenance of equipment and devices furnished; however, the Contractor is not responsible for furniture.
 3. Perform acceptance tests to show system is properly installed.
 4. VSS system administration will be by the City of New York. The System Administrator must be responsible to configure and maintain the system after Camera Installation. System utilities must be provided for the System Administrator to use.

PART 2 PRODUCTS

2.1 VIDEO SURVEILLANCE SYSTEM

- A. Software Manufacture: Genetec Omnicast, no exceptions
- B. Recording requirements must be confirmed with City of New York for days of retention and FPS recording. The contractor must assume to size the storage requirements based on 30days at 15FPS.

2.2 WORKSTATION

- A. Workstation Manufacture: Genetec SV-32 V2 Appliance (workstation and server), No Exceptions.
- B. Provide security workstation at designated location on the design drawings. This workstation will be for monitoring and or managing the video surveillance operations. Provide Keyboard and mouse.

2.3 WORKSTATION MONTIORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Dell 22” P2222H or comparable product by one of the following:
 - 1. Samsung
 - 2. LG
 - 3. or Approved Equal
- B. Provide security displays at designated location on the Contract Documents. This workstation will be for monitoring and or managing the video surveillance operations.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. Provide necessary work as detailed on Section 280000.

3.3 SYSTEM PROGRAMMING AND DATA ENTRY

- A. Provide all initial System programming and setup of the VSS including, but not limited to the following:
 - 1. Coordinate automatic camera selection, real-time record initialization, and recording status alarm annunciation requirements with the Commissioner prior to programming.
 - 2. Graphical Maps and Icons: Coordinate with the Commissioner to obtain AutoCAD architectural backgrounds for implementation as graphical maps. Import all AutoCAD background information and produce a complete set of graphical maps depicting all VSS points.
 - 3. On-screen alphanumeric identification of each camera. Coordinate descriptors with the Commissioner prior to programming.
 - 4. Automatic switching of recording from standby or reduced frame rate mode to real increased frame rate recording when an alarm occurs as defined herein.



- B. Enter all data needed to make the Security System operational. Deliver the data to the Commissioner on data entry forms, utilizing data from the Documents, Contractor's field surveys and all other pertinent information in the Contractor's possession required for complete installation of the database. Identify and request from the Commissioner any additional data needed to make the Security System fully operational and integrated. The completed forms must be delivered to the Commissioner for review and approval at least 90 days prior to the Contractor's scheduled date.

END OF SECTION 28 20 00



SECTION 28 21 00 - SURVEILLANCE CAMERAS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

- A. The work to be done under this section of the Specifications must include the furnishing of labor, material, equipment, and tools required for the complete installation of the work indicated on the Drawings, as specified herein, or as noted in other sections of Division 28 – Electronic Safety and Security.
- B. All materials, obviously, a part of the electronic security infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, must be furnished, and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one must be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher cost and/or higher level of functionality must be included to meet the design intent.

1.3 RELATED SECTIONS

- A. 28 00 00 Electronic Safety and Security
- B. 28 05 00 Common Work Results for Electronic Safety and Security
- C. 28 14 00 Access Control System Hardware
- D. 28 20 00 Video Surveillance

PART 2 PRODUCTS

2.1 CAMERAS

- A. Type C-2/C4 Indoor (surface) Fixed IP Dome Color Camera Minimum Specifications:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS M3066-V or comparable product by one of the following:
 - 1. Hanwha
 - 2. Bosch



3. or Approved Equal

1. The camera must integrate a camera and lens package into a small indoor enclosure that can be mounted directly to, or recessed into, a ceiling or wall.
2. The camera must offer a high resolution (HD) color camera, which features auto iris, simple day/night functions, and varifocal lens.
3. The indoor dome camera must be IP POE.
4. The camera must have manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.
5. The camera housings must be black for cameras on the first floor and white for cameras on the second floor. Submit sample to Commissioner for final approval.

C. Type C-22/C-7A Outdoor (Exterior) Fixed IP Dome Color Camera Minimum Specifications:

1. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Q3515-LVE or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal
2. The camera must integrate a camera and lens package into a small indoor enclosure that can be mounted directly to, or recessed into, a ceiling or wall.
3. The camera must offer a high resolution (HD) color camera, which features auto iris, simple day/night functions, and varifocal lens.
4. The indoor dome camera must be IP POE.
5. The camera must have manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.
6. The camera housing must be grey or silver. Submit sample to Commissioner for final approval.

D. Type C-LP Light Pole Mounted (Exterior) PTZ IP Dome Color Camera Minimum Specifications:

1. Basis-of-Design Product: Subject to compliance with requirements, provide PTZ Camera AXIS Q6155-E or comparable product by one of the following:
 1. Hanwha
 2. Bosch



3. or Approved Equal
2. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Cabinet T98A18-VE or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal
3. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Safety Kit or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal
4. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Power Supply DIN CP-D 24/4.2 or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal
5. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Pole Adapter T91B57 or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal
6. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Pole Adapter T91B57 or comparable product by one of the following:
 1. Hanwha
 2. Bosch
 3. or Approved Equal



7. Basis-of-Design Product: Subject to compliance with requirements, provide AXIS Media Converter T8607 or comparable product by one of the following:
 1. Hanwha
 2. Veracity
 3. or Approved Equal
8. The camera must integrate a camera and lens package into a exterior rated enclosure that can be mounted directly to a light pole using the necessary manufacture accessories.
9. The camera must offer a high resolution (HD) color camera, which features auto iris, simple day/night functions, and varifocal lens.
10. The indoor dome camera must be IP POE.
11. The camera must have manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.
12. The camera housing must be grey or silver. Submit sample to Commissioner for final approval.

2.2 CAMERA ENCLOSURE

- A. Provide CCTV camera housings and mounts as indicated on the Documents and as specified for camera types herein.
- B. Wiring to all cameras must pass from the back box through the mount and into the housing. Exposed wiring of any kind must not be acceptable.
- C. Provide sun shields for camera housings in outdoor locations exposed directly to sunlight.
- D. Provide weather and dust proof camera housings with thermostatically controlled heaters and blowers in outdoor locations.

2.3 NETWORK EQUIPMENT-to be furnished by City of New York.

- A. The network switch is to be located in IT Room (112).

2.4 NETWORK DISTRIBUTION

- A. Cable runs, and any IP transmission must be ANSI/TIA Category with matching RJ-Cable for cameras must ANSI/TIA Category UTP.
- B. 45 crimp type connectors, and must be installed with a control crimp tool, specified by the connectors' manufacturer.



- C. All video signals from cameras in the system must be home run to the closest respective IP Security Video System encoder secured in a telecommunications room in a separate secured rack and connected to the IP Network. All camera cabling must be pulled and terminated in coordination with the Telecom Cabling Trade in Div. 27 within 4' of the intended camera location. The cabling from the Camera to the termination jack shall be provided as part of this section.

2.5 WORKSTATION AND MONITORS

- A. Refer to other Division 28 Specifications.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

- A. Provide necessary work as detailed on Section 28 00 00.

3.3 SITE INSPECTIONS

END OF SECTION 28 21 00

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SECTION 28 42 00

GAS DETECTION AND ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Gas detection and Alarm System

1.3 SCOPE OF WORK

- A. Provide all labor, materials, products, equipment and service to supply and install Carbon Monoxide and Nitrous Oxide detection and control system indicated on the drawing and specified in this section.
- B. Reference standards: Units must be UL listed.

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 WARRANTY

- A. Warranty: One year from date of substantial completion.
- B. Sensor Warranty: 3 years (CO) / 1 year (NO2) from date of substantial completion

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Product: Subject to compliance with requirements, provide products by Kele, GDN series Network Compatible Gas detector or comparable product by one of the following:
 - 1. Mine Safety Appliances
 - 2. Armstrong Monitoring



3. Or Approved Equal.

2.2 PRODUCT DESCRIPTION

- A. Provide network compatible gas detector for continuous monitoring of toxic gases with MS/TP protocol support for seamless integration into building management system.
- B. The monitoring unit design must be flexible to accept pre-calibrated plug-in sensors.
- C. The unit must feature a minimum two-line LCD for local indication, self-test diagnostics and a built in 85 dBA buzzer.
- D. The system specifications must be as follows:
 1. Supply Voltage:17-27 VAC @ 8.4 VA, 50/60 Hz or 24-38 VDC @ 350 mA
 2. Accuracy:±3%
 3. Communication:RS485 Modbus, Bacnet MS/TP
 4. Measurement Range:
 5. CO:0-250 ppm
 6. N2O:0-10 ppm
 7. Sensor Types: Electrochemical CO and NO2
 8. Visual Indication:
 - a. Green LED: power
 - b. Amber LED 1: Alarm/fault :
 - c. Amber LED 2: Alarm/fault:
 9. Response Time:50 seconds or less
 10. Display:8 character, two-line LCD
 11. Relay Output: (1) DPDT pilot duty, 150 VA max inductive, 5A @ 30 VDC, 250 VAC
 12. Alarm Auditory Levels Db:85 dBA @ 10 ft
 13. Operating Temperature:
 - a. CO:-4° to 122°F (-20° to 50°C)
 - b. NO2:-40° to 122°F (-40° to 50°C)
 14. Operating Humidity:15 to 90% non-condensing
 15. Enclosure: ASA 61 gray enameled 16 gauge steel
 16. Supply Voltage: 120 VAC, 60 Hz
 17. Relay Contacts: Two DPDT 10A @ 250 VAC Res.
 18. max relays, for two thresholds
 19. Calibration: 0-100 ppm CO / 0-10 ppm NO2
 20. Alarm Points: 25 & 100 ppm CO, 1 & 3 ppm NO2
 21. Dimensions: (8.1” Hx 5.9 W” x 2.7D”)
 22. Weight: 41.84 lb
 23. Typical Sensor Life: 6 years (CO) / 2 years (NO2)
 24. Coverage: 3,000 sq.ft.
 25. Mounting Height: 4-5 ft above finished floor.
 26. Approvals: ETL

2.3 OPERATION

- A. Sensor alarm levels to activate ventilation fan to be installed to the following parameters:



TOXIC GASES	FIRST ALARM SETPOINT – LEVEL A (TLV-TWA)	SECOND ALARM SETPOINT – LEVEL B (TLV-STEL)	SENSOR LOCATION	RADIUS OF COVERAGE
Carbon Monoxide (CO)	25 ppm	100 ppm	4-5 ft above the floor	50 feet
Nitrous Oxide	1 ppm	3 ppm		

2.4 CALIBRATION KIT

- A. Provide calibration kit with carrying case, cylinder of 100 ppm CO and zero air test gas.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 SEQUENCE OF OPERATION

- A. The proposed ventilation exhaust fan is a variable speed fan and must be energized via relays in the monitoring panel.
- B. Activate garage ventilation exhaust fan when concentration reaches first alarm set point (Level A, see table above). The fan must continue to run until the concentration level remains at or above concentration Level A and continue to run and come to stop after an adjustable delay of five (5) minutes after the concentration level falls below Level A. Fans must be activated through relays on the controller.
- C. Install per manufacturer’s instruction. Provide all wiring in conduits.
- D. Provide wiring and interface programming with building management system (BMS).
- E. Set up the following operation mode:
 1. Activate audible and visual alarms integral to the controller when concentration reaches 75% LEL/Alarm Level B as indicated in the above table.
 2. Provide startup , operating and maintenance instructions

END OF SECTION 28 42 00

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SECTION 28 46 00

FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section includes fire detection and alarm system.

1.3 SCOPE

- A. The work covered by this Section of the Specification must include all labor, equipment, materials and services to furnish and install a Fire Alarm Control Panel. It must be complete with all necessary hardware, software and memory specifically tailored for this installation. It must be possible to permanently modify the software on site by using a plug-in programmer. The system must consist of, but not be limited to, the following:

1. Fire alarm control panel.
2. Addressable smoke detectors.
3. Addressable heat detectors.
4. Addressable analog duct smoke detectors for supply fans over 2,000cfm (Air handling systems shutdown control).
5. Addressable analog sprinkler waterflow alarm switches.
6. Addressable analog sprinkler tamper switch supervision.
7. Addressable analog horn and strobe annunciation devices (in combination and individual units as required and indicated).
8. Central station alarm connection control.
9. Addressable manual pull stations.
10. Emergency battery packs.

1.4 APPLICABLE CODES AND STANDARDS

- A. All equipment must be UL listed for its intended use.

- B. NFPA Standards 72 – National Fire Alarm Code
- C. NFPA Standards 13 - Installation of sprinkler systems
- D. The 2008 National Electric Code with NYC Amendments.
- E. 2014 NYC Building Code.
- F. All Equipment must be MEA/BSA Approved or OTCR Tested.

1.5 APPROVALS

- A. Secure permits and approvals prior to installation.
- B. Submit letter of approval for installation before requesting acceptance of system.

1.6 RELATED WORK

- A. The Contractor must coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the fire alarm system must include, but not be limited to:
 - 1. Sprinkler waterflow and supervisory switches to be coordinated with plumbing trade.
 - 2. Duct smoke detectors to be coordinated with HVAC trade.
 - 3. Fire Pump supervision contact to be coordinated by the fire pump control equipment trade.
- B. Selection of a central station agency, its equipment, its fees and fees for leased telephone lines will be coordinated the Commissioner.

1.7 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”
- B. Provide list of all types of equipment and components provided.
- C. Provide description of operation of the system, similar to that provided in Part 2 of this Section of the Specifications, to include any and all exceptions, variances or substitutions. Acceptance of exceptions and variations will be subject to review and approval by Commissioner.
- D. Provide manufacturer's printed product data, catalog cuts and description of any special installation procedures.
- E. Provide samples of various items when requested.
- F. Provide shop drawings as follows:

1. Drawing of the Fire Alarm Control Panel.
2. Single line riser diagram showing all equipment and type, number and size of all conductors.

1.8 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.9 WARRANTY

- A. Manufacturer must warrant the system equipment for a period of one (1) year from date of substantial completion.
- B. The contractor must guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements, provide products by Edwards System Technologies or comparable product by one of the following:
 1. Kidde, A UTC fire and security Co.
 2. Wheelock Inc., by Cooper
 3. Notifier, by Honeywell
 4. Simplex-Grinnell, by Tyco
 5. Or Approved Equal

2.2 CIRCUITING GUIDELINES

- A. Where it is necessary to interface Waterflow and Tamper switches , provide intelligent input modules to supervise Class B zone wiring.
- B. For conventional zone annunciation at the control panel zones must be as shown on the zoning schedule, but will be typically as follows:
 1. Sprinkler Waterflow Switches: Provide one (1) alarm zone for each waterflow switch or floor.
 2. Duct Smoke Detectors at Floor Return Ducts: Provide one (1) alarm zone for each floor.
 3. Duct Smoke Detectors at HVAC Air Handling Units: Provide one (1) alarm zone for each air handling unit.
- C. Each of the following types of devices or equipment must be provided with supervised circuits as shown on the drawings but will be typically as follows:

1. Sprinkler Valve Supervisory Switches: Provide one (1) supervisory module circuit for each sprinkler valve supervisory switch or floor.

2.3 FIRE ALARM CONTROL PANEL SEQUENCE OF OPERATION

- A. Refer to fire alarm drawing, FA-301, Fire Alarm Riser Diagram for the sequence of operation.

2.4 SUPPORT FOR INSTALLER AND MAINTENANCE

- A. Provide internal system diagnostics and maintenance user interface controls to display/report the power, communication, and general status of specific panel components, detectors, and modules.
- B. Provide loop controller diagnostics to identify common alarm, trouble, ground fault, and map faults. Map faults include wire changes, device type changes by location, device additions/deletions and conventional open, short, and ground conditions. Ground faults on the circuit wiring of remote module must be identified by device address.
- C. Allow the user to report history for alarm, supervisory, monitor, trouble, smoke verification, watchdog, and restore activity. Include Facility Name, Licensee, Project Program Compilation date, Compiler Version, Project Revision Number, and the time and date of the History Report.
- D. Allow the user to disable/enable devices, zones, actions, timers and sequences. Protect the disable function with a password.
- E. Allow the service user to enter time and date, reconfigure an external port for download programming, initiate auto programming and change passwords. Protect these functions with a password.
- F. City of New York will retain complete rights and ownership to all software running in the system at all times. The fire alarm equipment vendor must provide useable hard and soft copies of the software database to the City of New York at the time of final system acceptance. The database provided must be useable by any authorized and certified distributor of the product line and must include all applicable passwords necessary for total and unrestricted use and modification of the database. The extent of hardcopy database documentation to be provided must be defined by the Commissioner prior to final system acceptance.

2.5 EQUIPMENT

- A. Fire Alarm Control Panel
 1. The fire alarm control panel must incorporate all control electronics, relays, and necessary modules and components in a surface mounted cabinet. All under one label "UL listed and approved" for the use of fire alarm systems in this area of the United States of America. The operating controls and microphones must be located behind a locked door with viewing window. All control modules must be labeled, and all zone locations must be identified. The cabinet must be steel, with a gray finish. The assembly must contain



- a base panel, system power supply and battery charger with optional modules suitable to meet the requirements of these specifications.
2. System circuits must be configured as follows: Addressable analog loops Class B wiring.
 3. The system must be supervised, site programmable, and of modular design with expansion modules to serve up to 96 detectors and 94 remote addressable modules.
 4. The system must store all basic system functionality and job specific data in non-volatile memory. The system must survive a complete power failure intact.
 5. The system must have built-in automatic system programming to automatically address and map all system devices and provide a minimum default single stage alarm system operation with support reset common controls.
 6. The system must allow down loading of a job specific custom program created by system application software. It must support programming of any input point to any output point. The system must support the use of Bar Code readers to assist custom programming functions. It must allow authorized customization of fundamental system operations using initiating events to start actions, timers, sequences and logical algorithms.
 7. The system must support distributed processor intelligent detectors with the following operational attributes; integral multiple differential sensors, automatic device mapping, electronic addressing, environmental compensation, pre-alarm, dirty detector identification, automatic day/night sensitivity adjustment, dual normal/alarm LEDs, relay bases, and isolator bases.
 8. The system must use full digital communications to supervise all addressable loop devices for placement, correct location, and operation. It must allow swapping of "same type" devices without the need of addressing and impose the "location" parameters on replacement device. It must initiate and maintain a trouble if a device is added to a loop and clear the trouble when the new device is mapped and defined into the system.
 9. The system must have a UL Listed Detector Sensitivity test feature, which will be a function of the smoke detectors and performed automatically every 4 hours.
 10. The system must support 100% of all remote devices in alarm and provide support for a 100% compliment of detector isolator bases.
 11. All panel modules must be supervised for placement and return trouble if damaged or removed.
 12. The system must have a CPU watchdog circuit to initiate trouble should the CPU fail.
 13. The system program must meet the requirements of this project, current 2014 NYC Building Code and NYC Fire Code and NFPA Standards, and satisfy the New York City Fire Department.
 14. Passwords must protect any changes to system operations.
 15. The power supply must be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger must have low battery discharge protection. The power supply must provide



internal power and 24 Vdc at 4A continuous. Auxiliary power must be 24 Vdc at 500 mA. All outputs must be power limited. The battery must be sized to support the system for 24 of supervisory and trouble signal current plus general alarm for 15 minutes.

16. The LCD Display Module must be of membrane style construction with a 4 line by 20 character Liquid Crystal Display. The LCD must use supertwist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the total number of disable points. In the alarm mode display the total number of events and the type of event on display. Reserve 40 characters of display space for user custom messages. The module must have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, CPU fail, and test. There must be common control keys and visual indicators for; reset, alarm silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys must be integrated with the related common control indicators to flash the indicators when undisplayed events are available for display and turn on steady when all events have been displayed. Allow the first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event "hands free". Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module must have a numeric keypad, zero through nine with delete and enter keys.
17. The Main Control Module must control and monitor all local or remote peripherals. It must support the LCD Display Module, power supply, remote LCD and zone display annunciators, printers, and support communication interface standard protocol (CSI) devices such as color computer annunciators and color graphic displays. The system must provide one loop controller circuit, two notification appliance circuits, and common form 'C' contacts for alarm, supervisory, and trouble. Contact ratings must be 24Vdc at 1A.
18. The panel must be provided with a digital alarm communicator transmitter:
 - a. A digital alarm communicator transmitter (DACT) module to transmit alarm, supervisory and trouble signals to a Central Monitoring Station (CMS). The DACT must support dual telephones lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It must be possible to delay AC power failure reports, auto test call, and site program using a touch tone phone and password.
 - b. For the link to a Central Monitoring Station service, provide a 3/4 inch (DN 21) empty rigid conduit from the fire alarm control panel to the telephone frame room. Also provide a 2 #12 THWN in 3/4 inch (DN 21) conduit run from a 20 amp fuse cutout in the Fire Signaling System cutout panel to the telephone frame room. Terminate both runs as directed.

2.6 COMPONENTS

A. Intelligent Devices - General

1. Each remote device must have a microprocessor with non-volatile memory to support its functionality and serviceability. Each device must store as required for its functionality the



following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, number of alarms and troubles, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller.

- B. Photoelectric Smoke Detector (For Duct Applications and Machine or Electrical rooms).
1. Provide intelligent photoelectric smoke detector. The analog photoelectric detector must utilize a light scattering type photoelectric smoke sensor to sense changes in air samples from its surroundings. The integral microprocessor must dynamically examine values from the sensor and initiate an alarm based on the analysis of data. Systems using central intelligence for alarm decisions must not be acceptable. The detector must continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, aging and humidity. The information must be stored in the integral processor and transferred to the analog loop controller for retrieval using a laptop PC or the Signature Program/Service Tool. The photo detector must be rated for ceiling installation at a minimum of 30 ft (9.1m) centers and be suitable for wall mount applications. The photoelectric smoke detector must be suitable for direct insertion into air ducts up to 3 ft (0.91m) high and 3 ft (0.91m) wide with air velocities up to 5,000 ft/min. (0-25.39 m/sec) without requiring specific duct detector housings or supply tubes.
 - a. Temperature: 32oF to 120oF (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing.
 2. Duct Detector Housing,
 - a. Provide smoke detector duct housing assemblies to facilitate mounting an intelligent analog Photoelectric Detector along with a standard, relay or isolator detector mounting base. Provide for variations in duct air velocity between 300 and 4000 feet per minute (300 to 1000 feet per minute for ion-photo-heat detector). Protect the measuring chamber from damage and insects. Provide an air exhaust tube and an air sampling inlet tube which extends into the duct air stream up to ten feet. Provide drilling templates and gaskets to facilitate locating and mounting the housing. Provide five one gang knockouts for mounting optional Signature Series modules. Finish the housing in baked red enamel. Provide Remote Alarm LED Indicators and Remote Test Stations within 15 feet circuiting distance of its associated detector.
 3. Intelligent Heat Detectors Signature Series Model
 - a. The heat detector gathers analog information from their fixed temperature heat sensing elements and converts it into digital signals. The detector's on-board microprocessor measures and analyzes these signals. It compares the information to historical readings and time patterns to make an alarm decision. Digital filters remove signal patterns as to alleviate unwanted alarms. The microprocessor in each detector provides four additional benefits - Self-diagnostics and History Log, Automatic Device Mapping, Stand-alone Operation and Fast, Stable Communication.



- b. 70 foot (21.3 meter) spacing.
- c. 15° F (9° C)/min rate-of-rise/135° F (57° C) ft. and 135° F (57 ° C) fixed temperature type.
- d. Intelligent detector c/w integral microprocessor.
- e. Non-volatile memory.
- f. Automatic device mapping.
- g. Electronic addressing.
- h. Identification of defective detectors.
- i. Twin RED/GREEN status LEDs.
- j. Standard, relay, fault isolator, and audible mounting bases.

C. Intelligent Modules - General

- 1. It must be possible to address each Intelligent Signature Series module without the use of DIP or rotary switches. Devices using DIP switches for addressing must not be acceptable. The personality of multifunction modules must be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes must not be acceptable. The modules must have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED must flash to confirm communication with the loop controller. A red LED must flash to display alarm status. The module must be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring must be supervised for open and ground faults.
 - a. The module must be suitable for operation in the following environment:
 - b. Temperature: 32oF to 120oF (0oC to 49oC)
 - c. Humidity: 0-93% RH, non-condensing
- 2. Single Input Module
 - a. Provide intelligent single input modules. The Single Input Module must provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module must be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module must support the following circuit types:
 - 1) Normally-Open Alarm Delayed Latching (Waterflow Switches)
 - 2) Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
 - 3) Normally-Open Active Latching (Supervisory, Tamper Switches)
- 3. Dual Input Module



- a. Provide intelligent dual input modules. The Dual Input Module must provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module must be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The dual input module must support the following circuit types:
 - 1) Normally-Open Alarm Delayed Latching (Waterflow Switches)
 - 2) Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
 - 3) Normally-Open Active Latching (Supervisory, Tamper Switches)

4. Control Relay Module

- a. Provide intelligent control relay modules. The Control Relay Module must provide one form "C" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay must be rated for pilot duty and releasing systems. The position of the relay contact must be confirmed by the system firmware. The control relay module must be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.

D. Horn / Strobes

1. Fuse Cut Out/Fused Disconnect Switch:

- a. The primary source of power and the secondary source of power must each be provided with a means of disconnect from the fire alarm system. Each disconnect must consist of a fused disconnect switch, locked in the ON position with key kept on premises accessible only to authorized personnel. Such disconnect must be painted red and permanently identified as fire alarm circuit and labeled as to system/location served, with a means of interrupting the unfused neutral and all ungrounded conductors.
- b. The fire alarm system fused disconnect switch on the transformer secondary side must comply with the requirements of the primary and secondary power source fused disconnect switches specified above.
- c. Fused cutouts must be provided where multiple circuits are required to support the fire alarm system and related auxiliaries mounted in a fused cutout panel suitable for the number of circuits needed. The Contractor must provide an individual cartridge fused cut-out panel with three (3) poles and a removable, solid copper, neutral bar in fuse gap for the FCS, remote Data Gathering Panels (DGPs), booster power supplies and other fire alarm equipment. Fused cut-outs must be provided with silver sand fuses, current limiting type with an interrupting capacity rating of 200,000 amps (r.m.s. symmetrical). The fused cut-out panel must bear an engraved white-core phenolic or bakelite identification nameplate stating in minimum one-quarter inch (1/4") high white letters on a red background "FIRE ALARM FUSED CUT-OUT". A four (4) wire feeder must bring three phase 120/208 volt service to the fused cut-out.
- d. The size of the fuses must be sized appropriately but be thirty (30) amperes minimum.



- e. The feeder must be tapped off the main building service ahead of the main service switch but after the Current Transformers (Metering Transformers).

E. Manual Fire-Alarm Boxes

- a. General Requirements for Manual Fire-Alarm Boxes: Must be UL listed. Boxes must be finished in red with molded, raised-letter operating instructions in contrasting color; must show visible indication of operation; and must be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 1) Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 - 2) Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.7 WIRING INSTALLATION

A. Electrical wiring serving fire alarm systems must comply with the following requirements:

- 1. Power conductors (above 75 volts) must be:
 - a. Copper: THHN, THWN/THHN, TFFN, TFN, FEP, RHH, RHW-2, XHH, or XHHW; minimum 600 volts; 90 C; for installation in rigid metallic conduit (RMC)intermediate metallic conduit (IMC) or electric metallic tubing (EMT).
 - b. Cable type MI, listed for 2-hour fire resistance rating.
- 2. Low voltage conductors (75 volts and less) must be:
 - a. Copper: THHN, THWN/THHN, TFFN, TFN, FEP, RHH, RHW-2, XHH, XHHW; minimum 600 volts; 90 C; for installation in RMC, IMC or EMT.
 - b. Minimum wire size No.18 AWG.
 - c. Multi-conductor cables run in raceways, or exposed as described hereinafter, and must be listed to UL 1424-05, Standard for Cables for Power-Limited Fire-Alarm Circuits, with the listing agency certifying compliance with the following additional requirements:
 - 1) Type FPLP only; minimum insulation thickness 15 mils; minimum temperature 150 C; colored red.
 - 2) Red colored jacket overall; minimum thickness 25 mils.
 - 3) Cable marked as per UL 1424 must bear additional description "ALSO CLASSIFIED NYC CERT. FIRE ALARM CABLE" legible without removing jacket.
- 3. Installation of conductors and raceways must be in accordance with the following:



- a. Power conductors must not be installed in common raceways with low voltage conductors.
 - b. Installations must comply with applicable requirements of the electrical code, or if the requirements of this rule exceed those of the electrical code must comply with the requirements of this rule.
 - c. Conductors other than MI cable must be run in raceway, except as specifically described in item (c)(3)(iv) of this rule.
4. Multi-conductor cables may be installed without raceway protection where cables are protected by building construction. Where not protected by building construction, cables must be located 8 feet (2438 mm) vertical or more above the finish floor and not subject to physical tampering or hazard. Locations within 8 feet (2438 mm) of the finished floor that are deemed as protected by building construction must include raised floors, shafts, telephone and communication equipment rooms and closets, and rooms used exclusively for fire alarm system equipment.
 5. All wiring within mechanical and elevator equipment rooms must be run in raceways.
 6. Raceways run within 8 feet (2438 mm) vertical of the finish floor in garage areas, loading docks, mechanical rooms, and elsewhere where subject to mechanical damage, must be rigid galvanized steel conduit only.
 7. Where wiring is required to be run in raceways, install conductors in RMC, IMC, or EMT except that multi-conductor cables may also be run in surface metal raceway. Flexible metallic conduit, not exceeding 36 inches (914 mm) in length, must be permitted for final connections to initiating and notification devices. Conductors for other electrical systems must not be installed in raceways containing conductors serving a fire alarm system.
 8. Where allowed to be run without raceway protection, multi-conductor cables must be installed as follows:
 - a. Cables must not depend on ceiling media, pipes, ducts, conduits, or equipment for support. Support independently from the building structure.
 - b. Secure by cable ties, straps or similar fittings, so designed and installed as not to damage the cable. Secure in place at intervals not exceeding 60 inches (1524 mm) on centers and within 12 inches (305 mm) of every associated cabinet, box or fitting.
 9. Installation of raceways, boxes and cabinets must comply with the following general requirements:
 - a. Covers of boxes and cabinets must be painted red and permanently identified as to their use.
 - b. Penetrations of fire-rated walls, floors or ceilings must be fire stopped. See drawing E-501 Detail 6 for raceway penetration fire stopping detail.
 - c. Within stairways, raceways must not be installed within 8 feet (2438 mm) vertical of the finish floor.



- d. Raceways or cables must not penetrate top of any equipment box or cabinet.
10. All conduits supplying 120-volt power to the fire command station and/or fire alarm control unit and/or to outlying control cabinets, must contain a green insulated grounding conductor sized in accordance with the electrical code (#10 AWG minimum). The grounding conductor must be connected to the ground bus or other suitable grounding terminal in each box and cabinet in which it enters. At the fuse cutout panel supplying the fire alarm system, a grounding electrode conductor sized and installed in accordance with the electrical code (#10 AWG minimum) must be provided.
11. For cabinets whose 120-volt supply is not derived from the main fire alarm system cutout panel, green insulated separate grounding electrode conductors, sized and installed as per the electrical code (#10 AWG minimum), must be provided. In steel-framed buildings, a connection to local steel structure will be acceptable.
12. Splices and terminations of wires and cables must be as follows:
 - a. Permitted only in boxes or cabinets specifically approved for that purpose.
 - b. Utilize mechanical connections specifically approved by UL 486A-03, Wire Connectors or UL 486C-04, Splicing Wire Connectors for the conductors, or if soldered, first joined so as to be mechanically and electrically secure prior to soldering and insulating. Temperature rating of completed splices must equal or exceed the temperature rating of the highest rated conductor.
13. Wiring for audible notification devices – speakers (i.e. stairwells) must be arranged so that a loss of a portion of the wiring in a stairwell will not render more than 60 percent of the devices of each type inoperative, and the devices must be so connected to the circuitry (i.e., by means of alternate “A” and “B” circuits) as to maintain at least partial audibility throughout the entire stairwell.

2.8 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- C. Connect to grounding electrode specified in Division 26 Section "Grounding." Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements of Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- D. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. The entire system must be installed in a workmanlike manner, in accordance with approved manufacturer's wiring diagram. The contractor must furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring must be of the type recommended by the manufacturer, approved by the FDNY, and must be installed in rigid, threaded conduit throughout.
- B. All penetration of floor slabs and fire walls must be fire stopped in accordance with all local fire codes.
- C. End of Line Resistors must be furnished as required for mounting as directed by the manufacturer.
- D. All wiring must be color coded throughout, to National Electrical Code standards.
- E. The system must be arranged to receive power from one three wire 120 Vac, 15 A supply. All low voltage operation must be provided from the fire alarm control panel.
- F. Field Quality Control
 - 1. The system must be installed and fully tested under the supervision of a trained manufacturer's representative. The system must be demonstrated to perform all of the function as specified.

3.3 TESTS

- A. Reports of any field testing during installation must be forwarded to the Commissioner.
- B. Each individual system operation on a circuit by circuit basis must be tested for its complete operation. The procedure for testing the entire fire alarm system must be set forth with the consent of the FDNY, the Commissioner and the manufacturer.

3.4 DOCUMENTATION AND INSTRUCTION

- A. The contractor must compile and provide the City of New York (3) complete manual on the completed system to include operating and maintenance instruction, catalog cuts of all equipment and components, as-built wiring diagrams and a manufacturer's suggested spare parts list.
- B. In addition to the above manuals, the contractor must provide the services of the manufacturer's trained representative for a period of four (4) hours to instruct City of New York's designated personnel on the operation and maintenance of the entire system. An End-User Instructional Video



must be included as part of the system documentation in two formats - DVD and PC (Media Player compatible).

END OF SECTION 28 46 00



SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes the following:

- 1. Acceptable types of fill.
- 2. Backfilling and compaction procedures.
- 3. Excavation procedures.
- 4. Quality control and inspection of earthwork.
- 5. Groundwater conditions and earthwork.
- 6. Subgrade preparation.

- B. Related Sections

- 1. Section 07 13 00 “Foundation Waterproofing” for Groundwater conditions and earthwork, for Subgrade preparation
- 2. Section 31 64 00 “Drilled Caissons” for Excavation procedures

1.3 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified must be in accordance with the requirements of the Contract Documents and 2014 New York City Building Code.

1.4 WORK INCLUDED

- A. All labor, materials, equipment, accessories, and services necessary for, or incidental to the completion of the excavation, foundation construction, and filling and grading as shown on the Drawings and specified herein.

- B. The work of this section includes, but is not limited to, the following:

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1. Removal of existing pavements, curbs, utilities, and former foundation walls, pile caps, grade beams etc., designated for removal; relocation of fence and fence posts when necessary and other structures encountered or left by wreckers, old walls, rubble, etc.
2. All earth, concrete, and rock excavation to the bottom of foundation subgrades, pile caps, foundation walls, pits and slabs as required and indicated on drawings or to a lower elevation to achieve required bearing.
3. Excavation, filling and rough grading of site area at adjacent structures and roadways as required and within the Contract Limit Line.
4. Excavation, filling, grading and compacting to required elevations for appurtenances and site work.
5. Excavation, filling, grading and compacting to required elevations for all floors and slabs on grade.
6. Excavation and trenching for mechanical trades, including but not limited to all plumbing, heating, water, gas and electric within the buildings as shown or required by the drawings; backfilling same with clean fill as described hereinafter; and thoroughly compacting to "Rough Grading" elevations. Excavation, filling and grading for mechanical trades outside the building must be the responsibility of each trade.
7. Providing additional approved suitable material for filling and rough grading.
8. Legal disposing off the site of surplus excavated materials unsuitable for filling or backfilling. Refer to environmental specifications.
9. Pumping and dewatering as required for work of this section and for foundation work.
10. Other labor and materials as may be reasonably inferred to be required to make the work under this Section complete.

1.5 RELATED SECTIONS

- A. Foundation Waterproofing – Section 07 13 00
- B. Drilled Caissons– Section 31 64 00

1.6 STANDARDS AND REFERENCES

- A. The following publications form a part of this Specification to the extent indicated by the specific citations in other paragraphs of this Specification. In case of conflict, the particular requirements of this Specification will govern, unless indicated otherwise.



1. Latest versions of American Society for Testing and Materials (ASTM) and American Association of State and Highway Transportation Officials (AASHTO) Publications and standards.
 2. ACI-318 latest edition-Building Code Requirements for Structural Concrete.
 3. Geotechnical Engineering Study prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
 4. 2014 New York City Building Code (NYCBC)
- B. Conform to the relevant provisions of the 2014 Building Code and Rules and Laws of the City of New York.

1.7 WORK DEFINITIONS

- A. Wherever the word “excavating”, “excavate”, “excavation”, “carried down”, “remove”, etc., are used, they must be taken to include the removal of all existing work, including brick work, rubble work, former foundation remnants, rubbish, earth, as well as rock, boulders, steel grillages and concrete and all other materials and obstructions encountered; they must also be taken to include all sheet piling, bracing, pumping, and all operations and items needed for the proper execution of the work. Excavation is considered unclassified.
- B. Where the words “finished grades”, “finished grade lines”, or “future finished grades”, appear in these specifications, they must be taken to mean the finished elevations as indicated on the drawings.
- C. Rough grading consists of cutting or filling to the elevation established on the Contract Drawings.

1.8 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.9 SUBMITTALS

- A. Test Reports: Submit the following information for each source of each material submitted for review and comment by the Commissioner:
1. Test reports on borrow material as follows:
 - a. Particle size analysis in accordance with ASTM D 422 (sieve only).
 - b. Soil classification in accordance with ASTM D 2487
 - c. Moisture content in accordance with ASTM D 2216



- d. Modified Compaction Curve in accordance with ASTM D 1557.
 - 2. Include data for all samples indicating the exact location and methods of transportation and placement of all materials.
 - 3. Include verification that borrow material is not contaminated.
 - B. Samples:
 - 1. Submit a 5-lb (minimum) sample of each borrow material proposed for use as general fill, drainage fill and controlled fill.
 - C. The Contractor must prepare and submit the following items to the Commissioner for approval at least 15 days before the start of said work. All calculations and shop drawings must be signed and sealed by a Professional Engineer licensed in the State of New York.
 - D. Method Statement: Submit a detailed method statement, drawings, and calculations to be reviewed by the Commissioner. The method statement, drawings and calculations must be prepared by a Professional Engineer licensed in the State of New York. The submittals must include but not limited to following:
 - 1. Earth excavation procedures.
 - 2. Backfilling and compacting material, equipment and procedures.
 - E. Catalog Cuts: Submit catalog cuts and manufacturer’s literature for compaction equipment, and waterproofing.
 - F. Dewatering: Submit descriptions, drawings, and equipment specifications and other information detailing the means and methods to be used for local dewatering of deep pits. Methods must be such that the groundwater lowering at the perimeter of the site does not exceed one foot or a level required to protect any adjacent structures.
 - G. Certification For Examination of Site and Records: Before proceeding with the Work, submit certification in an acceptable form, signed by the Contractor, stating that careful examination has been made of the site, existing structures, existing adjacent structures, records of utility lines, test boring records, soil samples, subsurface exploration reports, the Drawings, and all other Contract Documents.
- 1.10 QUALITY ASSURANCE
- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- 1.11 PROJECT CONDITIONS
- A. The Project (Rodman’s Neck Bomb Squad Headquarters (BSH)) is in Pelham Bay Park in the Bronx. The site is 56,000 square feet and occupies the entirety of New York City Block 5650
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Lot 1. The site is on a peninsula extending south into the Hutchinson River between Eastchester Bay to the west and Pelham Bay to the east.

- B. Existing site grade is generally level at round el 8.5 (NAVD88) with no more than about a foot of relief across the site.
- C. The proposed development will consist of a series of permanent buildings, will replace several temporary wood-frame and modular buildings. The permanent buildings will include the #7 Dog Training building, the Bomb Squad Building and the #8 Storage Building. No cellar space is planned for these proposed buildings. The proposed #7 Dog Training building footprint will be about 1,000 square feet. The footprints of the Bomb Squad Building and the #8 Storage Building will be 6,500 square feet and 5,100 square feet, respectively.
- D. Subsurface Conditions – The general subsurface conditions at this site consist of fill, soft organic clay, followed by a layer of medium dense sand. Below the sand was a layer of highly decomposed rock that continued to the top of bedrock. The top of bedrock was encountered between about 23 and 35 feet below existing grade, corresponding to about el -15 to -27 (NAVD88). Bedrock sloped down within the site generally from north to south and east to west. Details regarding the subsurface conditions at the site are presented in the Geotechnical Report.
- E. Groundwater – Groundwater was typically measured to be between about el 5.2 (NAVD88).
- F. Obstructions including concrete, brick, metal debris, and boulders, may be encountered at the site.
- G. Soil and rock samples taken from the borings are available for the Contractor’s inspection.
- H. The Contractor, by careful examination, must stay informed as to the nature and location of the work; the conformation of the ground, the nature of the subsurface conditions; the locations of the groundwater table; the character, quality, and quantity of the materials to be encountered; the character of the equipment and facilities needed preliminary to and during the execution of the work; and all other matters which can in any way effect the work.
- I. The Contractor must be held to have visited the site and to be familiar with the existing conditions of adjoining properties, utilities and buildings.
- J. The soil and groundwater may be impacted by contaminants.
- K. Soil samples and rock cores are available for the Contractor’s review. The City of New York makes no predictions or representations regarding the character or extent of soil, rock, or other subsurface conditions to be encountered during the work. Additional borings and other exploratory operations may be performed by Contractor, at the Contractor’s option and following the Commissioner’s approval. No change in the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.



- L. The Contractor must investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations affecting transportation to, ingress and egress of the site of the work. The Contractor must conform to all New York City and State, and Federal regulations in regard to the transportation of materials to and from and at the job site and must secure in advance such permits as may be required.
- M. Existing Utilities: Locate existing underground utilities in and beyond the areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during the work.
 - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company immediately for directions. Cooperate with The City of New York and utility companies in keeping respective services and facilities in operation. Correct damaged utilities to satisfaction of utility company.
 - 2. Do not interrupt existing utilities serving facilities occupied by The City of New York, during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
 - 3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- N. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.
- O. Compliance with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).

1.12 PROTECTION

- A. The work must be executed so that no damage or injury will occur to the existing public and adjoining or adjacent structures, streets, paving, sewers, gas, water, electric or any other pipes. Should any damage or injury caused by the Contractor, or anyone in Contractor's employ, or by the work under this Contract occur, the Contractor must correct such damage and must assume all responsibility for such injury.
- B. The above must also include the protection of all existing utilities (including sewers, water lines, electrical lines and telecommunication lines) to remain in use within and adjacent to the area affected by the work of this project.
- C. Monuments, bench marks and other reference features on streets bounding this project, must be protected. Should these be disturbed in any manner, the Contractor must have them replaced.



- D. Excavation sides of any pits within the site and adjacent structure foundations must be protected by means of adequate bracing, shoring and anchoring at all times. No site excavation will proceed until adequate support for excavation sides is provided. Contractor is solely responsible for the stability, safety and protection of excavation sides.
- E. The Contractor must provide barricades, warning lights, and barriers to prevent accidents, and to prevent all hazards to protect the public and property at all times, including Saturdays, Sundays, and Holiday.

1.13 ERRORS IN DEPTH

- A. In the event that any part of the excavation is carried, through error, beyond the depth and the dimensions indicated on the drawings or called for in the specifications, then the Contractor, at their own expense, must furnish and install gravel, stone, or structural concrete with which to fill to the required level at all locations, subject to approval of the Commissioner.

1.14 SUBSURFACE STRUCTURES AND UTILITIES

- A. The Contractor must become acquainted with the existence and location of all surface and subsurface structures and utilities within the project area and beneath the surrounding streets. Contractor must not damage any of those utilities that are to remain and must leave them accessible and make the necessary provision by sheeting, hanging, supporting or other means necessary to obtain this result, subject to the approval of the New York City Building Department and Department of Transportation, and the utility companies involved.

1.15 DESIGN OF TEMPORARY WORK

- A. Temporary work must be designed and installed so that the permanent work can be conveniently and adequately erected. Contractor must be responsible for the adequacy of temporary work.
- B. Temporary work must be maintained in good condition.
- C. Temporary work must be changed, shifted, rebuilt, etc., as needed to suit the conditions of the permanent work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. On-Site Soil: The use of on-site soils as backfill will not be permitted.
- B. Structural Fill or Controlled Fill: Well-graded sand and gravel, free of deleterious materials, organic material, cinders, frozen material, trash, masonry or rubble and free of stones having a dimension greater than 4 in. Of the material passing No. 4 Sieve, the percent by dry weight



passing the No. 200 sieve must be 10% or less and the percent by dry weight passing the No. 100 sieve must be 40% or less.

- C. Drainage Fill: Clean natural ¾-inch crushed stone (recycled concrete must not be used as drainage fill) having the following gradations:
- D. General Fill: Must have no more than 20% by weight of stones or masonry debris, containing no stones or other materials greater than 4 inches in any dimension and contain less than 50% by weight materials finer than No. 200 mesh sieve.

Sieve Size	%Passing by Weight
2 inch	100
¼ inch	25 to 60
No. 40	5 to 40
No. 200	0 to 5

- E. Fill for utility trenches must meet the criteria given for structural fill and must not contain sharp, angular pieces and pieces larger than 2 inches in any dimension.
- F. Before bringing any fill to the site, the Contractor must submit the source for approval by the Commissioner, in accordance with Section 1.9 of this specification.
- G. All fill materials (structural, granular, and general fill) required must be free from wood, debris, combustible materials, vegetable matter or any material subject to decay or disintegration. Fill material must not be contaminated.
- H. The use of recycled concrete aggregate must not be permitted for use as fill behind vertical foundation walls.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION OF PROJECT SITE

- A. Obtain all necessary permits to perform the work from the appropriate authorities and agencies prior to start of such work. Obey all applicable Occupational Safety and Health Administration (OSHA) rules and regulations.



- B. Install all necessary protection equipment, structures such as fences, signs, scaffolding, etc. prior to start of work.
- C. Remove all existing structures, utilities, pavement in accordance with the Contract Documents.
- D. Protect all utility lines, which are not to be abandoned. Contractor is responsible for any damage to utilities that may occur.

3.3 PROTECTION AND MONITORING OF ADJACENT STRUCTURES, STREETS AND UTILITIES

- A. The work must be executed so that no damage or injury will occur to the existing public and adjoining or adjacent structures, streets, paving, sewers, or utilities. Should any damage or injury caused by the Contractor, or anyone in Contractor's employ, or by the work under this Contract occur, the Contractor must correct such damage and must assume all responsibility for such injury.

3.4 SITE DRAINAGE

- A. The Contractor must assume the responsibility for site drainage and must maintain such drainage during the life of this contract in a manner so as not to adversely affect adjacent areas and structures.

3.5 PUMPING AND DEWATERING

- A. The Contractor must assume the sole responsibility for site drainage upon entering the premises including obtaining and maintaining all relevant permits, and must maintain such drainage during the life of the contract, meeting all applicable regulations and permits, and so as not to adversely affect the adjacent areas.
- B. The groundwater must be maintained at least 2 ft below the subgrade level at the time of waterproofing installation and placement of concrete. For pit excavations, the groundwater must remain depressed until the concrete has reached 80 percent of its required strength.
- C. The Contractor must, during the progress of the work, provide and maintain all required pumps, wells, suction and discharge lines, power, etc. in sufficient number, capacity, and configurations to keep all excavation, pits, trenches, footings, foundations, and the entire property area free from accumulation of water at all times and under any and all circumstances and contingencies that may arise.
- D. The methods of dewatering must be at the option of the Contractor, provided that dewatering be accomplished in a manner that will preserve the strength of foundation strata, will not cause instability of the excavation sides, will not result in movement of excavation faces or loss of ground from beyond the property lines, and will not cause damage to existing structures, bridges, train tracks, streets, pavements, and utilities.



- E. The Contractor is responsible for obtaining all necessary permits to dewater the site so as not to impede this or any other work.
- F. Any dewatering method selected by the Contractor or which, after installation and while in operation, causes or threatens to cause damage to adjacent property must be modified by the Contractor at no expense to the City of New York.
- G. The Contractor is responsible for all remedial action and associated costs due to problems arising from improper control of surface water and groundwater.
- H. The Contractor must not use any portion of the building foundation units or any part thereof as a sump for drainage resulting from pumping in any other area. The Contractor must not conduct water to privately owned properties.

3.6 GENERAL EXCAVATION

- A. The excavation is unclassified and must comprise and include the satisfactory removal and legal disposal of all materials encountered regardless of the nature of the materials and must be understood to include, boulders, earth, hardpan, miscellaneous fill, foundations, structures, slabs, walls, utilities, pavements, curbs, piping and debris.
- B. All excavation must extend to the depths of the form and size required for the installation of the work as indicated on the drawings.
- C. Excavation must be to required elevations for bottom of pile caps, floors, pits, slabs, walls, etc. Excavation must be made to a depth that will allow installation of full depth of concrete slabs, sub-base, and waterproofing as shown on drawings within a 1 inch tolerance. Excavation lines must provide sufficient clearance for the proper execution of all concrete work including allowances for formwork, shoring and inspection.
- D. Materials that, in the opinion of the Commissioner, are not suitable for fill, any surplus earth and all rock, must be removed from the site and legally disposed of.
- E. The bottom of excavations must be leveled and graded to receive foundations, slabs, pits, trenches and grade beams.

3.7 TRENCH EXCAVATION

- A. Excavation for Building Slabs and Structural Members
 - 1. Subgrades of building slabs and structural members including framed slabs and grade beams must be approved by the Commissioner before proceeding with their construction. Subgrades resulting from excavation must be free of unsuitable material (fill, loose rock pieces, organics, debris, etc.) as judged by the Commissioner.



- 2. Where required, waterproofing must be installed in accordance with the Contract Drawings and related specification.
- 3. Unauthorized Excavation: Excavations performed below the elevations shown or specified, must be filled and compacted as hereinafter specified, at no additional cost.
- 4. Authorized Additional Excavation: Where the Commissioner determines that the bearing material encountered is unsuitable, remove the unsuitable bearing material. The removed material must be replaced with controlled fill or concrete as directed by the Commissioner.

3.8 PROOFROLLING

- A. Prior to backfilling, all excavations should be proofrolled using a minimum 3-ton roller. Any loose areas identified by proofrolling should be removed and replaced with controlled fill in accordance with Article 2.1/B.

3.9 FILLING, GRADING AND COMPACTING

- A. Filling and backfilling will not be performed until work has been inspected by the Commissioner. All wood, paper and other deleterious materials must be cleaned out from excavations before backfilling.
- B. The filling or backfilling within the area of the building must be done so that there will be no void spaces below floors and bottoms of pits and trenches, unless otherwise noted.
- C. General: Material for fill and backfill must be Controlled Fill as herein specified under Part 2 of these specifications. Material may be obtained from borrow sources and must be free of any contamination.
- D. Placing: Place fill in horizontal 12-inch-thick maximum loose layers to produce a uniform thickness of material. Start placement in the deepest area and progress approximately parallel to the finished grade. Do not place fill where free water is standing, on frozen subsoil or on surfaces that have not been approved.
- E. Compacting: Compact each layer of fill with appropriate equipment listed below in this Article to achieve as a minimum the following percentages of maximum density at optimum moisture when tested in accordance with ASTM D1557:

LOCATION	% MAX. DENSITY
Under Building Slab-on-Grade	95
Under Paved Areas	95



Under Structural Members and Structural Slabs	92
Behind Foundation Walls	95

- F. **Compaction Equipment:** Granular fills (sand, gravel, friable earth) must be compacted with a vibratory plate compactor not less than 0.5 ton in static weight to the extent possible. A jumping jack must be used in and around penetrations, small restrictive areas, or any other areas not accessible to the roller or heavy plate compactor.
- G. **Backfilling against Foundation Walls:** After completion of foundation walls and removal of forms, clean the excavation of all trash and debris before application of waterproofing and/or vapor barrier and placement of backfill.
- H. Do not backfill against foundation or basement walls until completion of supporting floor construction to top of backfill or to first level above top of backfill, unless adequate temporary shoring is provided.
- I. If Contractor elects to backfill against foundation or basement walls prior to completion of supporting floor slabs, these walls must be shored. Temporary shoring must be designed by a professional engineer licensed in the State of New York retained by the Contractor. Shoring design and calculations must be submitted to the Commissioner for their review and approval.
- J. In placing backfill, take special care to prevent wedge action, eccentric loading or overloading of the structure by equipment used for compacting backfill material, and to prevent damage to waterproofing on walls. Where subsoil drainage systems are installed, place backfill to prevent any damage to the systems. Any damage to waterproofing or drainage systems caused by backfilling or excavation operations must be corrected or replaced by the Contractor at own expense.
- K. Additional backfilling required to bring fill to the finished subgrades shown, must be done by the Contractor only after the concrete walls or piers, against which the backfilling is done, have attained their full design strength, have been braced and the written permission to backfill is obtained from the Commissioner. If fill is required on both sides of a wall, it must be brought up simultaneously and evenly on both sides.
- L. The Contractor must do all filling necessary to bring the ground surfaces to the required levels for floors, pits, and areaways as shown on the drawings.
- M. Any surplus materials must be removed from site and legally disposed of. Should additional material be required for the placing of backfill, other than material obtained from the site, the Contractor must obtain, deliver and place accepted backfill material as required.

3.10 FIELD QUALITY CONTROL



- A. The City of New York will engage a qualified Geotechnical Engineer to review all laboratory test results and submitted reports specified in this Section for special inspection.
- B. The City of New York’s Geotechnical Engineer will interpret the tests, state in each report whether or not the test specimens and results comply with all requirements of the Contract Documents and note any deviations.
- C. The City of New York’s Geotechnical Engineer will identify when and where samples are to be obtained for testing.
- D. The City of New York will engage a qualified testing agency to perform tests and inspections. The Contractor must collect samples and forward them to the City of New York’s Testing Agency. Testing Agency will submit the following laboratory test reports to the Commissioner.
 - 1. Laboratory results conducted on each type of borrow and fill material:
 - a. Gradation Analysis – ASTM D 422.
 - b. Atterberg Limits – ASTM D 4318.
 - c. Modified Moisture Density Curve Determination – ASTM D 1557.
 - 2. The City of New York’s Geotechnical Engineer will determine the conformance of materials to be used for fills.
- E. Field Inspection:
 - 1. All field inspections must comply with the requirements of the 2014 New York City Building Code.
 - 2. Building Slab Subgrades: The City of New York will engage a qualified special inspector to inspect subgrades for all building slabs. No pavement or slab can be constructed unless the subgrade is approved by the City of New York’s Special Inspector.
 - 3. Proofrolling: Proofrolling operations must be inspected by the qualified special inspector engaged by the City of New York.
 - 4. Backfilling and Compaction: The City of New York will hire a qualified testing agency to verify the densities of the fill placed. The testing agency must take field density tests of the fill placed and report to the Commissioner. No fill can be placed without inspection and approval of the City of New York’s testing agency and Commissioner. The testing agency will take field tests (in accordance with ASTM D 2922) of the subgrade for every 2,500 sq-ft, but not less than 3 tests per lift in each area, and a minimum of three tests for every compacted soil lift behind foundation walls.

3.11 CLEAN-UP

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- A. All excess material including, earth, rock, fill, must be removed from site and legally disposed of.
- B. All lumber, forms and metal work must be removed immediately after completion of work in local areas. The Contractor is responsible for removal of all debris produced by work to this section from the site.
- C. Sidewalk and streets adjoining the property must be broom-cleaned and free of debris, rubbish, trash and obstructions of any kind caused by the work of this Section.

END OF SECTION 31 00 00

SECTION 31 01 00

SITE WORK STANDARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes: the construction of roadways and utilities to support the project.

1.3 CITY OF NEW YORK SPECIFICATIONS AND STANDARDS

A. City of New York

1. Department of Design and Construction, Division of Infrastructure Standard Sewer Specifications dated December 1996.
2. Department of Environmental Protection, Bureau of Water Supply and Wastewater Collection, Latest Sewer Standard Specifications and Standard Drawings.
3. Department of Environmental Protection, Bureau of Water Supply and Wastewater Collection, Latest Standard Water Main Specifications and Standard Drawings.
4. Department of Transportation, Bureau of Traffic Division of Traffic Engineering and the Division of Street Lighting, Standard Specifications and Standard Drawings.
5. Department of Transportation, Bureau of Highway Operations, Standard Specifications Dated June 1986 with all the latest Addendums and Latest Standard Details of Construction.
6. Fire Department, Bureau of Fire Communications, Standard Specifications and Drawings.
7. Police Department, Communications Division, Standard Specifications and Drawings.
8. Department of Parks and Recreation Standard Specifications and Drawings.

B. State of New York



1. Department of Transportation Standard Specifications, Construction and Materials dated January 2, 1990; N.Y.S.D.O.T. Standard Drawings (latest revision).
- C. The preceding Specifications with their appropriate Standard Details will be referred to as follows:
 1. N.Y.C.D.E.P. Sewer Specifications
 2. N.Y.C.D.E.P. Water Specifications
 3. N.Y.C.D.O.T. Traffic Specifications
 4. N.Y.C.D.O.T. Highway Specifications
 5. F.D.N.Y.C. Fire Specifications
 6. N.Y.C.P.D. Police Specifications
 7. N.Y.C.D.P.R. Parks Specifications
 8. N.Y.S.D.O.T. Highway Specifications
- D. U.S. Department of Labor
 1. The Contractor must comply with Occupational Safety and Health Administration Standards for the Construction Industry.
- E. Technical Specifications
 1. The above referenced Standard Specifications and associated Standard Drawings and Details are hereby made an integral part of the Technical Specifications of the Contract Documents, except as modified, added to, or otherwise changed as required by this project.
 2. Any portion of these Standards Specifications such as references to unit price measurement and payment provisions, which are not applicable to the work of this Contract must be disregarded.

1.4 PRIVATE UTILITIES

- A. Private utilities, such as sewers, water mains, electric, gas, telephone, etc., exist in the project area. The Contractor is advised to protect the existing utilities which are to stay, and to maintain or reroute those which are to be removed or abandoned until new utilities are in place. Any damage done to facilities belonging to private utility companies must be restored by the Contractor at their own expense as per their specific standards and specifications.
- B. Contractor must notify utilities a minimum of ten working days prior to excavation, in compliance with New York State Industrial Code Rule 53 by calling the New York City One-Call Center at Telephone Number 1(800) 272-4480.

1.5 SPECIAL PROVISIONS

The following must become part of and apply to the Contract:



A. Lines and Grades

1. The Contractor must furnish lines and grades in accordance with Section 6.14 and 1.06.27 of the N.Y.C.D.O.T. Standard Specifications.
2. The Contractor must submit to the Commissioner a certification from Professional Engineer or Land Surveyor, Licensed in the State of New York, that the lines and grades used in the completed work comply with the contract requirements or such revisions thereof which the Commissioner must direct or order.
3. The Contractor must provide the required survey parties and all necessary surveying equipment. The Contractor must make all necessary computations and determine the alignment, elevation and position for all construction work. The Contractor must be responsible for the accuracy of all lines and grades established.
4. The Contractor must be responsible to make any adjustments necessary in the line and grades shown on the plans in order to ensure the new work meets existing conditions at the point of connection to existing roadways and access drives.

B. Specific Traffic Stipulations

1. The Contractor must perform the work in strict accordance with the specific traffic stipulations determined by NYCDOT and/or as directed by the Commissioner.

C. Contractor's Representative

1. The Contractor or their authorized representative must be present on the work site at all times while work is being progressed to receive and promptly execute all orders or directions of the Commissioner. The foregoing provision must be complied with irrespective of whether work is being progressed by the Contractor or their subcontractor's forces.

D. Maintenance of Traffic

1. Signs, barricades, lights and warning signals must be furnished and placed as necessary for the safety of vehicular and pedestrian traffic, and as directed by the Commissioner in consultation with NYCDOT.
2. Whenever maintenance of traffic is required on public or private streets and access roads and walks in conjunction with the construction work in the project area, the Contractor must follow rules and regulations of N.Y.C. D.O.T. Bureau of Traffic Operations and must observe the traffic stipulations set by NYCDOT.

E. Excavation

1. All excavation is unclassified. No additional compensation will be made for excavation of any items encountered, regardless of material or description. Project excavation must include any and all excavations required within the contract limits that may be required to construct the roadways and utilities, in accordance with the plans and specifications. Limited boring reports and test pit data may be available for Contractor's reference.

F. Construction Permits

1. The Contractor must obtain all applicable construction permits for the projects. The Contractor must obtain and pay for all necessary permits and certificates of inspection and must give all notices and pay all legal fees required by City departments and New York State agencies having jurisdiction in connection with the work under this Contract.
2. All work within private property areas performed under this Contract must conform to the rules and regulations of the Bureau of Electrical Control, Department of General Services, the Building Laws of the City of New York, and all other agencies having jurisdiction.
3. Upon completion of the work, the Contractor must obtain certificates of approval from the various agencies and departments having jurisdiction and must deliver a copy to the Commissioner.

1.6 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTIONS

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

END OF SECTION 31 01 00

SECTION 31 22 00

GRADING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].
- B. Contractor accepts boring reports and includes all costs for removal of debris, rock, foundations and piles to complete the work of this section.

1.2 SUMMARY

A. Section Includes:

- 1) This work must consist of general earthwork provisions not covered elsewhere under other sections of these specifications. All excavation is “Unclassified”. No additional compensation will be made for excavation of items encountered, regardless of material or description.
- 2) The work must consist of the excavation and disposal of all materials encountered of any description. All excavation must be performed within the limits required for construction or as directed by the Commissioner.
 - a. Unclassified excavation must consist of the excavation and disposal of all materials, of any description, encountered in the course of construction, unless otherwise specified.
 - b. Unclassified excavation also includes all obstructions, piles, pile caps, structures, foundations, etc. encountered in the course of construction, such materials to be removed to a depth of 2' - 0" below the subgrade of the new construction (trench bottom, etc.)
- 3) Excavation must be done to the lines, grades and limits shown on the Contract Documents, or as otherwise required to complete the work.
- 4) Contractor must perform rough grading and proofrolling of all subgrade areas to within 1" of required subgrade elevation, except as modified in other sections of these Specifications.
- 5) Draining and/or pumping, if required, must be performed to keep excavations free from water.
- 6) Work must include stockpiling on site and disposing of off site excess suitable excavated granular material; Disposing of off site excavated material not suitable for backfilling, including rubbish and debris.



- 7) Laying out of lines and grades must be performed by a licensed Surveyor for final grading.
- 8) Work includes cleaning up the site upon completion of Contract Work.

1.3 RELATED WORK

- A. Related work is described in the following sections of the specifications.
Section 31 23 00
Excavation and Fill

1.4 REFERENCES

- A. Perform all required work in accordance with the applicable rules and regulations and the Codes and Ordinances of NYCDOT, NYCDDC, NYSDOT, and NYCDEP
- B. All work and material must comply with the provisions of Sections 4.11 and 6.02 of the NYCDOT Highway Specifications.

1.5 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit for approval within 14 days after Notice to Proceed:
- C. Proposed methods, equipment and sequences of operations for excavation.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. The Contractor must not perform proofrolling or final grading operations on soil which is too wet to be properly rolled or compacted as determined by the Commissioner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. See applicable provisions of Sections 31 23 00

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.



3.2 GENERAL EARTHWORK DRAINAGE AND GRADING PROVISIONS

- A. The Contractor must provide and maintain slopes, crowns and ditches on all excavation and embankments to ensure satisfactory surface drainage at all times. Ditches and other drainage facilities necessary to remove ponded water must be constructed as soon as practical to have the work area dry during the progression of work. All existing culverts and drainage system to remain must be maintained in satisfactory operating condition throughout the course of the work. If it is necessary to interrupt existing surface drainage, sewers or under-drainage, then temporary drainage facilities must be provided until the permanent drainage work is complete.
- B. Any portion of an embankment or subgrade which has, in the opinion of the Commissioner, been damaged by the Contractor's equipment during the course of construction, must be restored and recompactd by the Contractor to the satisfaction of the Commissioner.
- C. Where seepage causes instability of cut slopes, excavation and backfill or other corrective measures must be performed as ordered by the Commissioner. Excavation for the installation of slope protection may be necessary at any time and location throughout the duration of the contract and may not necessarily coincide with the Contractor's performance of the general excavation work.

3.3 COMPACTION

- A. See applicable provision of Section 31 23 00.

3.4 SCHEDULING OF WORK TO MINIMIZE SOIL EROSION

- A. The Contractor must prepare and submit to the Commissioner for approval, schedules for all excavation, stripping, embankment, fill and grading operations connected with the project in or outside of the project limits. Earthwork must not be started at a given location until the method and sequencing of all operations are established in accordance with approved plans and approved by the Commissioner and per Contractor's approved Erosion Control Scheme.

3.5 ARCHAEOLOGICAL SALVAGE

- A. Whenever, during the course of construction, historical objects are encountered, such objects must not be destroyed or moved. Work must be stopped and rescheduled to avoid disturbing such areas and the Commissioner be notified immediately.

END OF SECTION 31 22 00

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SECTION 31 23 00

EXCAVATION AND FILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

- 1) Grading, filling, proofrolling, compaction testing, and placement and compaction of stone subbase for placement of pavement.
- 2) Furnishing, placement and compaction of subbase material.
- 3) Draining and/or pumping, if required, to keep excavations free from water.
- 4) Stockpiling on site and disposing off site of excess suitable excavated granular material. Disposing off site of excavated material not suitable for filling, including concrete, timber, metal, rubbish and debris.
- 5) Laying out lines and grades by a surveyor for final grading.
- 6) Obtaining the services of an approved testing laboratory for compaction testing of backfill material.
- 7) Cleaning up the site upon completion of Contract work.

1.3 RELATED WORK

- | | |
|----------------------|-------------------------------|
| A. Section 31 22 00: | Grading |
| B. Section 31 25 00: | Erosion and Sediment Controls |
| C. Section 32 11 36: | Concrete Base Courses |
| D. Section 32 16 13: | Curbs and Gutters |

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM C 117 - Test Method for Material Finer than No. 200 Sieve in Mineral Aggregates by Washing.
 2. ASTM C 136 - Method for Sieve Analysis of Fine and Coarse Aggregates.



3. ASTM D 422 - Test Method for Particle- Size Analysis of Soils.
 4. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb Hammer and 12 inches Drop. (Standard Proctor Test)
 5. ASTM D 1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
 6. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods. (Mustow Depth)
 7. ASTM D 3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods. (Mustow Depth)
 8. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- B. NYSDOT Specifications and Standard Sheets and NYCDOT Specifications and Standard Drawings.

1.5 SUBMITTAL PROCEDURES:

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Proposed equipment to be used in compacting fill or backfill material.
- C. If imported fill is used, provide gradation curves for approval prior to start of work. When imported material is used, the contractor must submit a ticket with each load of material delivered to the site indicating date and time loaded and delivered, source of material, amount in the load and class of material.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.
- B. The Contractor must not perform proofrolling or final grading operations on soil which is too wet to be properly rolled or compacted as determined by the Commissioner.
- C. Fill material for grading will be subject to the approval of the Commissioner.
- D. Commissioner must inspect the subgrade prior to placement of subbase.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fill within roadway areas must comply with the requirements of NYSDOT specifications and Section 4.11.3 of the NYCDOT highway specs.
- B. Granular base for sidewalks must comply with the requirements of NYSDOT specifications and Section 4.13.3 of the highway specifications, as modified by Addendum page AA-2K.
- C. Utility trench bedding and backfill requirements must be specified in Section 31 23 33 of these specifications.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 PREPARATION AND LAYOUT

- A. Establish extent of excavation by area and elevation; designate and identify datum elevation.
- B. Set required lines and levels.
- C. Maintain benchmarks, monuments and other reference points.

3.3 EXCAVATION

- A. All excavation is unclassified and consists of removal and disposal of material encountered when establishing required grade elevations unless otherwise noted on the Contract Drawings.
- B. Excavate to elevations required for installation of permanent construction in such a manner as to not disturb the subgrade below such elevations.
- C. All debris, excess material, and all material unsuitable for backfill or fill, must become the property of the Contractor and be disposed of off site.
- D. Unauthorized excavation consists of removing of materials beyond indicated subgrade elevations, limits or dimensions without specific direction of the Commissioner. Unauthorized excavation, as well as remedial work directed by the Commissioner, must be at the Contractor's expense.

- E. Fill must be placed at a moisture content within 2% of the optimum moisture content for the material to be placed. Material that is too wet for placement must not be used as back fill.

3.4 UTILITIES

- A. Existing utility systems and service lines to remain and those encountered during excavation, if damaged, must be restored at the Contractor's expense. Relocation of existing utility systems and service lines, to accommodate the completion of the project, whether on or off the site, must be the responsibility of the Contractor.

3.5 COMPACTION

- A. Prior to placement of fill, the subgrade must be proofrolled with a minimum of two passes by the approved roller that is to be used for backfill placement.
- B. Fill must be compacted to achieve a density of at least 95 percent of the Standard Proctor maximum density as determined by ASTM D 698.
- C. Fill must be placed in maximum twelve inch loose lifts and compacted with a maximum of six passes with an approved vibratory roller, except that hand-tamping will be required within 18-inches of underground facilities.
- D. Do not place and compact fill on frozen subgrade.

3.6 DEWATERING

- A. Prevent surface water and subsurface water or groundwater from flowing into excavations and from flooding project site and surrounding area.
- B. Do not allow water to accumulate in excavations. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- C. Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits. Do not use trench excavations as temporary drainage ditches.

3.7 MATERIAL STORAGE

- A. Stockpile satisfactory excavated materials where directed. Place, grade and shape stockpiles for proper drainage.
- B. Locate and retain soil materials away from edge excavations.
- C. Storage areas must be subject to the approval of the Commissioner.

- D. All excess material not incorporated in the work must become the property of the Contractor and must be disposed of off site in a legal manner.

3.8 FIELD TESTS

- A. The City of New York will engage the services of an approved testing laboratory for Special Inspection to determine the in-place density of the soil after compaction is completed. All proctor analyses of soils and in-place density testing must comply with the requirements of NYSDOT specifications and Section 7.12 of the NYCDOT Highway Specifications.
- B. Compaction tests must be performed at a minimum frequency of one for every 2500 square feet of pavement area shown on the Contract Drawings. Tests may be ordered on compacted pavement subgrade or compacted granular base for sidewalks. Test methods may be either Sand-Cone (ASTM D 1556), or nuclear method determined by ASTM 3017, as approved by the Commissioner.
- C. If fill and backfill have not been sufficiently compacted as determined by in-place density tests, the compaction effort must be continued and moisture content must be adjusted as necessary until the specified compaction is obtained.

3.9 CLEAN UP

- A. All surplus materials furnished by the Contractor and all equipment and temporary structures must be removed from the site by the Contractor. All dirt and rubbish must be hauled off site and the construction site left clean to the satisfaction of the Commissioner.

END OF SECTION 31 23 00

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SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. The excavation, bedding, backfilling and compaction for pipes and utility trenches.
 2. Removal of all obstructions encountered during the course of construction in trenches.
 3. Excavations within one foot of finished subgrade must be done with care to prevent disturbance to subgrade materials.
- B. To furnish and deliver backfill, place and compact backfill in the excavated trench for sewers, water mains and other utilities as shown on the plans in accordance with the specifications and/or directed by the Commissioner.
- C. Excavation to the lines, grades and limits shown on the Contract Drawings and Standard details.
- D. Draining and/or pumping, if required, to keep excavation and trenches free from water.
- E. Stockpiling on site and disposing off site excess suitable excavated granular material, disposing off site excavated material not suitable for backfilling, including rubbish and debris.
- F. Laying out lines and grades, by survey, for pipe/utility installation and final grading.
- G. Backfilling and compaction of stone bedding and backfill material to the lines and grades indicated on the Contract Drawings and Standard details.
- H. Protection of existing utilities and structures to remain that are exposed during excavation.
- I. Cleaning up the site upon completion of Contract work.

1.3 RELATED WORK

- A. Related work is described in the following sections of the specifications:
1. Section 31 22 00: Grading
 2. Section 31 25 00: Erosion and Sediment Controls

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM C 117- Test Method for Material Finer than No. 200 Sieve in Mineral Aggregates by Washing.
 2. ASTM C 136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
 3. ASTM D 422 - Test Method for Particle - Size Analysis of Soils.
 4. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb Hammer and 12-in. Drop (Standard Proctor Test)
 5. ASTM D 1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
 6. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods. (Mustow Depth)
 7. ASTM D 3017 - Test Method for Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods. (Mustow Depth)
 8. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- B. NYSDOT Specifications and Standard Sheets, Standard NYCDEP Sewer Specifications, NYCDEP Water Specifications, Standard Specifications of private utility companies and applicable Standard Drawings and NYCDOT requirements.

1.5 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit 14 days prior to placement of backfill:
1. Proposed equipment to be used in compacting trench backfill material.
 2. For Select Granular Fill or where other imported fill is used, provide gradation curves. When imported material is used, the contractor must submit a ticket with each load of material delivered to the site indicating date and time loaded and delivered, source of material, amount in the load and class of material. This will not be a basis for payment.
- C. Submit 14 days prior to installation of final paving or subbase course:
1. Compaction test results of backfill material used in trench backfilling.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Work and materials must be in accordance with NYSDOT and NYCDOT requirements. Fill within utility areas must comply with the requirements of Section 4.11.3 of the NYCDOT highway specs.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 UTILITIES

- A. Prior to excavation, investigation must be made by the Contractor to determine the exact locations of existing underground structures and utilities. The Contractor must notify all affected utility companies in the area a minimum of 10 working days before commencing work.
- B. Contractor must excavate with extreme caution when excavating near or above locations of known or suspected pipes and utilities.
- C. Do not traverse paved areas with tracked vehicles or equipment such as carry-all scrapers which may damage such pavement unless protected to the satisfaction of the Commissioner.
- D. Existing underground utilities must be located prior to excavation of utility trenches.

3.3 EXCAVATION

- A. All trench excavation work must comply with Standard Sewer Specifications Sections 4.02 and 4.03 and with Form No. 5 of the Standard Water Specifications.
- B. Open cut from surface to elevations required for removal of utilities.
- C. Existing foundations, pile caps, or other existing construction must be removed in entirety within the limits of the excavation and 24" below subgrade. Piles are to be cut off at a 45 degree chamfer two feet below subgrade.

3.4 SHEETING AND SHORING

- A. Where required for safe excavation operations, for protection of adjacent utilities and structures or where otherwise required for performance of the Work, secure the sides of excavations against movement as follows:



1. Install sheet piling or sheeting held in place by waling and bracing members. Top of sheeting must extend at least six inches above ground.
 2. Do not excavate below the bottom of sheet piling or sheeting except as necessary to install sheeting.
 3. Comply with all NYCDOT, NYSDOT, NYCDDC, and NYCDEP rules and regulations.
- B. Where sheet piling or sheeting is required, submit detailed shop drawings and design calculations of the sheeting and bracing system to the Commissioner for review. Submit such drawings and calculations three (3) weeks prior to commencement of trench excavation. Shop drawings and calculations must be prepared by a Professional Engineer licensed in the State of New York who has a minimum of five years experience in the design of soil retaining structures. The shop drawings must be sealed and signed by a licensed NY State Professional Engineer. Sheeting design criteria must meet the requirements of NYCDEP Standard Sewer Specifications Section 4.05 and the minimum design loads given in Standard Sewer Dwgs. 71 and 72.
- C. Trenches may be widened to provide stable slopes or protected by use of a portable trench shield in lieu of sheeting.
- D. Sheeting and bracing materials must be removed in lifts during backfill operations.

3.5 EXISTING STRUCTURES AND UTILITIES

- A. Structures which are to remain must not be disturbed without consent of the Commissioner and representatives of affected utilities. Brace and shore structures and utilities when exposed to prevent damage. Any damage must be immediately reported to the affected utility company and the Commissioner. The Contractor will be responsible for restoration to the satisfaction of the Commissioner and the utility company.
- B. Perform excavation around and adjacent to existing structures, pipes and conduits which are to remain in place, without damage to or movement of existing construction. When excavation is to be performed under such structures, pipes and conduits, support them in a manner as approved by the Commissioner and the utility company to ensure uninterrupted operation of the supported items.

3.6 ABANDONED UTILITIES

- A. Close open ends of abandoned underground utilities with sufficiently strong closures to withstand pressures which may result after closing.
- B. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs, or other suitable method for the type of material and size of pipe. Do not use wood plugs.
- C. Close open end of concrete and masonry utilities with not less than eight inches thick brick masonry bulkheads, constructed to completely fill the opening.

3.7 DEWATERING

- A. The Contractor must provide and maintain at their own expense ample means and equipment such as pumps, drains and sumps for dewatering and properly disposing of water entering the trenches, and other parts of the work.
- B. Prior to placement of any permanent construction or filling or backfilling any excavated area, lower the water table in said area to one foot below the elevation of the required subgrade and maintain this condition until the construction or pavement is placed thereon.
- C. Dewatering must be done in an approved manner such that the subgrade can be trimmed, foundation materials, pipe or concrete placed in the dry, without disturbing bearing materials, and water from the excavation must be disposed of in such a manner that will cause no injury to property or inconvenience to the public.
- D. Dewater in a manner to prevent the loss of ground due to the migration of soil fines into the dewatering system.

3.8 STORING MATERIALS AND CARE OF STRUCTURES

- A. All excavated and other materials must be so placed as not to endanger the work, and so that free access may be had at any time to all parts of the trench and to all hydrants and valves or pipes in the vicinity, and must be kept neatly in piles, so as to inconvenience little as possible public travel or adjoining tenants.
- B. Storage areas must be subject to the approval of the Commissioner.

3.9 ALIGNMENT AND GRADE

- A. Finished trench bottoms must be true and even and must be maintained to lines and grades established by the plans. Trench bottoms for gravity sewer or drainage pipes must be checked for alignment and grade to the satisfaction of the Commissioner before laying pipe.

3.10 BACKFILL AND COMPACTION

- A. Fill must be placed in maximum twelve inch loose lifts and compacted with a maximum of six passes with an approved vibratory roller, except that hand-tamping will be required within 18- inches of underground facilities.
- B. Overlap passes of roller must be a minimum of six inches.
- C. Moisture content of backfill and fill material must be within a range of plus or minus two percent of optimum.
- D. Do not place fill or backfill on frozen subgrade.



- E. The surface of filled areas must be within plus or minus one inch of elevations shown on the Contract Drawings unless a closer tolerance is necessary to meet requirements of other Sections of the specifications or the Contract Drawings.
- F. Fill within all utility areas must comply with the requirements of Section 4.11 of the NYCDOT highway specs. As noted in Section 4.11.6, fill must be compacted to achieve a density of at least 95 percent of the Standard Proctor maximum density.

3.11 CLEAN UP

- A. All surplus materials furnished by the Contractor and all tools and temporary structures must be removed from the site by the Contractor. All dirt and rubbish must be hauled off site and the construction site left clean to the satisfaction of the Commissioner.

3.12 FIELD TESTS

- A. The City of New York will engage the services of an approved testing laboratory for Special Inspection to determine the in-place density if the soil after compaction is completed. All proctor analyses of soils and in-place density testing must comply with NYSDOT Specifications and Section 7.12 of the NYCDOT Highway Specifications.
- B. Density tests are to be performed as directed at trench subgrade, at various lifts of compacted trench backfill and at pavement subgrade. The minimum number of field density tests that must be performed is as follows:
 - 1. At least one test must be performed on every lift.
 - 2. At least one test must be performed on every full work shift compaction operations.
 - 3. At least one test must be performed for every 100 cubic yards of material placed in trenches.
 - 4. At least one test must be performed for every 400 cubic yards of materials placed in large fills or embankment areas.
 - 5. Additional tests must be performed whenever a change in either the quality of compaction or gradation of backfill is suspected, as ordered by the Commissioner.
- C. If fill and backfill have not been sufficiently compacted as determined by in-place density tests, the compaction effort must be continued and moisture content must be adjusted as necessary until the specified compaction is obtained.

END OF SECTION 31 23 33

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. To provide erosion and sediment control structures and procedures including but not limited to the following. The Contractor must provide additional erosion control measures if so directed by the Commissioner.
 - a. Erosion control structures/methods:
 - 1) Silt fence, straw bales, temporary swales, stabilized construction entrances, dust control, etc.
 - 2) To comply with New York City and State regulations for erosion and sediment control during construction and to protect uncovered soil from erosion.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit shop drawings illustrating proposed sediment control structures and methods.
- C. Design of erosion and sediment control structures/methods must be as per New York Standards and Specifications for Erosion and Sediment Control.

1.4 REFERENCES

- A. New York Standards and Specifications for Erosion and Sediment Control, NYSDEC.
- B. Reducing the impact of storm water runoff, NYSSCS.

1.5 PERMITS

- A. The Contractor must obtain all necessary permits for disposing of storm water.

1.6 RELATED WORK

- A. Related work is described in the following section of the specifications.
 - 1. Section 31 22 00: Grading
 - 2. Section 31 23 00: Excavation and Fill

1.7 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Silt Fence
 - 1. Silt Fence Fabric: The fabric must meet the following specifications unless otherwise approved by NYC DEP.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D 1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D 3786
Puncture Strength (lbs)	40	ASTM D 751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW -02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26



2. Fence Posts (for fabricated units): The length must be a minimum of 36 inches long. Wood posts must be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts must be standard T and U section weighing not less than 1.00 pound per linear foot.
 3. Wire Fence (for fabricated units): Wire fencing must be a minimum 14 ½ gage with a maximum 6 in. Mesh opening, or as approved.
 4. Prefabricated Units may be used in lieu of the above method providing the unit is installed per details shown.
- B. Individual strawbales must be minimum 3 feet long and wire or nylon bound.
- C. Stakes: Wooden stakes must be 2" x 2" x 4 to 5 feet long.

2.2 MANUFACTURERS

- A. Filter Fabric:
1. Suggested manufacturer:
 - a) TC Mirafi
 - b) Colbond
 - c) WebTec
 - d) Or approved equal.
- B. Prefabricated silt fence:
1. Suggested manufacturer:
 - a) Geo Fabrics
 - b) TC Mirafi
 - c) DGI Industries
 - d) Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Sediment basin must be provided as specified below and/or directed by the Commissioner.
1. An emergency spillway is required.
 2. One anti-seep collar must be used and placed 25 feet from the riser.
 3. Watertight bands must be used.
 4. All pipe material must be of good quality with no holes.



- B. Street drop inlet protection must be provided wherever diverted runoff from disturbed area must be conveyed to existing or new inlets as specified below.
1. Filter fabric must have an equivalent opening size of 40-85.
 2. Cut fabric from a continuous roll to eliminate joints.
 3. Place geotextile fabric under grate and over curb piece. Geotextile to be provided with sufficient excess fabric to allow 1" extension beyond grate in roadway area and 6" extension beyond back of curb.
 4. Coarse aggregate no. 8 to be installed above geotextile fabric on curb as required to keep fabric in place.

Fabric Properties	Light Duty Roads Grade Subgrade	Heavy Duty Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 (modified)
Equivalent Opening Size	40-80	40-80	US Std Sieve CW -02215
Aggregate Depth (in)	6	10	--

- C. Field drop inlet protection must be provided wherever diverted runoff from disturbed area must be conveyed to existing or new inlets as specified below:
1. Filter fabric must have an EOS of 40-85. Burlap may be used for short term applications.
 2. Cut fabric from a continuous roll to eliminate joints. If joints are needed they will be overlapped to the next stake.
 3. Stake materials will be standard 2" x 4" wood or equivalent metal with a minimum length of 3 feet.
 4. Space stakes evenly around inlet 3 feet apart and drive a minimum 18 inches deep. Spans greater than 3 feet may be bridged with the use of wire mesh behind the filter fabric for support.
 5. Fabric must be embedded 1 foot minimum below ground and backfilled. It must be securely fastened to the stakes and frame.
 6. A 2" x 4" wood frame must be completed around the crest of the fabric for over flow stability.
- D. Stabilized construction entrance must be provided at all entrance and exit points of the construction site as specified below and/or directed by the Commissioner.
1. Filter cloth must be to the fabric properties shown below:



2. Stone Size: Use 2" stone, or reclaimed or recycled concrete equivalent.
3. Length: Not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
4. Thickness: Not less than six (6) inches.
5. Width: Twelve (12) foot minimum, but not less than the full width at points where ingress or egress occurs. Twenty-four (24) foot if single entrance to site.
6. Filter Cloth: Will be placed over the entire area prior to placing of stone.
7. Surface Water: All surface water flowing or diverted toward construction entrances must be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
8. Maintenance: The entrance must be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of way. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
9. When washing is required, it must be done on an area stabilized with stone and which drains into an approved sediment trapping device.
10. Periodic inspection and needed maintenance must be provided after each rain.

E. Dust Control

1. To prevent surface and air movement of dust from disturbed soil surfaces that may cause offsite damage, health hazards, and traffic safety problems, the following measures must be implemented:
 - a. Vegetative Cover: Buffer areas of vegetation should be left where practical.
 - b. Mulch: To cover disturbed areas by mulch (including gravel mulch).
 - c. Sprinkling: The site may be sprayed until the surface is wet.

END OF SECTION 31 25 00



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SECTION 31 41 16

SHEET PILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:

1. To furnish, deliver and install sheeting necessary for protection of excavations including utility trenches and utility structures (manholes, etc.) in accordance with the plans, as per NYSDOT standards and specifications, N.Y.C.D.E.P. standards and specifications, OSHA requirements and/or as directed by the Commissioner.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit shop drawings for the type of sheeting the Contractor plans to use for the project area, complete with structural design and installation procedures, etc. for approval by the Commissioner. All structural designs, drawings and supporting documentation must be signed and sealed by a Professional Engineer licensed in the State of New York. Sheeting design criteria must follow the requirements of NYCDEP Standard Sewer Specification Section 4.05, and Standard Drawing Nos. 71 and 72 as well as all applicable NYSDOT standards and requirements.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The Contractor has an option to use wood or metal sheeting. Each type of sheeting planned for use in the project area must be pre-approved.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Sheeting must be installed as per approved shop drawing plans.

END OF SECTION 31 41 16



SECTION 31 64 00

DRILLED CAISSONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. This Section includes the following:

1. Installation of drilled foundation caissons.
2. Testing requirements of drilled foundation caissons.
3. Special Inspections requirements of drilled foundation caissons.
4. Grout placement of drilled foundation caissons.
5. Steel reinforcement of drilled foundation caissons.
6. Monitoring and tolerances of drilled foundation caissons.

- B. Related Sections

1. Section 03 30 00 “Cast-in-Place Concrete” for Grout placement of drilled foundation caissons.
2. Section 07 13 00 “Foundation Waterproofing” for Installation of drilled foundation caissons and pile caps.

1.3 GENERAL REQUIREMENTS

- A. Work governed by this section, as shown or specified must be in accordance with the requirements of the Contract Documents and the 2014 New York City Building Code.
- B. Work of this Section, as shown or specified, must be in accordance with the Sediment and Erosion Control Plan, where applicable.

1.4 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, services and operations necessary to complete work of installing drilled caissons to lines and finished cut-off elevations as indicated on the Contract Drawings and as specified herein, including, but not limited to, the following:
1. Caissons must have capacities of 80 tons in compression and 50 tons in tension and 2 tons in lateral resistance.



2. Caissons must include casing that is a minimum thickness of 0.545 inches, with an outer diameter of 9.625 inches.
3. Caissons must include one reinforcement bar, size #14, made of steel grade 75.
4. Caissons must be constructed with rock sockets that have a minimum bond length of 6.5 feet, and a minimum diameter of 8.5 inches. Caisson rock sockets must be in New York City Building Code Class 1c or better bedrock.
5. Caissons must be tremie grouted with minimum 5 ksi grout.
6. Design and testing of grout mixes.
7. Submission of all required shop drawings, supporting data, mill certificates and the like for cement, admixtures, aggregates, water, reinforcing steel, accessories, compounds, coatings, and the like.
8. Furnish all required falsework, cribbing, dunnage, etc. to provide safe access to caisson locations.
9. Protection of the associated structures, and all other adjacent structures and utilities to remain.
10. Furnish all equipment, including down-hole digital video equipment and labor necessary to facilitate visual inspection and documentation of caisson rock sockets. Entry into caissons will not be required. The Contractor must provide all labor, materials, and equipment necessary for alternative means to verify the conditions of rock sockets where field conditions prevent use of down-hole video inspection.
11. Lateral load testing of 2 drilled caissons in total as indicated on the Contract Drawings. Caissons must have a permanent steel casing, reinforcing cage, and all necessary concrete fill so as to sustain the minimum design capacities as indicated on the Contract Drawings.
12. Removal and legal disposal of excess drilling mud and spoils generated as part of the drilling process.
13. Provide all field stakeout, field monitoring, and documentation of as-built conditions of caissons.
14. Provide all necessary labor and monitoring equipment necessary to monitor the inclination of the caissons during drilling as specified herein.
15. Submission of as-built caisson location survey, video inspection records, and installation logs.
16. The Contractor must provide the Special Inspector with reasonable office space (with heating, cooling, electricity) on site to conveniently prepare and maintain all necessary project records pertinent to their duties and store necessary equipment. This must include a minimum of one desk space, a lockable storage closet, and wireless internet access.

1.5 STANDARDS AND REFERENCES



- A. General: Except as modified or voided by requirements specified herein or by details or notes included in the Contract Drawings, the Work specified under this Section must conform to all applicable provisions of the codes, specifications, standards and other reference documents cited in this Specification and/or noted in the Contract Drawings.
- B. Codes: All Work under this Section must conform to the most restrictive requirements of the Building Code of the City of New York (2014).
- C. Where more stringent, the following codes, standards and specifications (latest edition), must apply to the Work, all as modified herein or by the above mentioned Building Code:
 - 1. Field Reference Manual: Specifications for Structural Concrete, ACI 301, with Selected ACI and ASTM References, SP 15. Contractor must keep at least one full copy in the field office at all times.
 - 2. Building Code Requirements for Structural Concrete (ACI 318-11) and Commentary (ACI 318R-11) referred to hereafter as ACI Code.
 - 3. Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, ACI 211.1
 - 4. Guide for Measuring, Mixing, Transporting and Placing Concrete, ACI 304.
 - 5. Recommended Practice for Evaluation of Strength Test Results of Concrete, ACI 214.
 - 6. Structural Welding Code – Reinforcing Steel, ANSI/AWS D1.4.
 - 7. Structural Welding Code – Steel, ANSI/AWS D1.1
- D. ASTM (American Society for Testing and Materials) Specifications cited in ACI 318, ACI 301, this Specification or in cited reference documents must be the year of adoption or tentative adoption and revision listed in the latest edition of the Annual Book of ASTM Standard, "Index", except that, should a specific year of adoption or revision be cited by the Contract Documents, by Building Code, or be proposed by Contractor and accepted by City of New York, that edition must apply to and control the Work.
- E. Lateral Load Test Procedure: Lateral load tests must be performed in accordance with ASTM D3699 "Standard Test Method for Piles under Lateral Loads" (latest edition).
- F. Geotechnical Engineering Report prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture, and Geology, D.P.C., dated 29 January 2021.
- G. The Contractor must meet NYCDEP Limitations for Effluent, NYSDEC and EPA limitations for discharge into any surface water bodies, federal EPA and State Department of Transportation regulations for shipping of regulated substances to off-site disposal facilities, and meet all regulatory requirements imposed by the Treatment, Storage and Disposal Facility. Regulations pertaining to the handling, transport and disposal of regulated substances/materials include, but are not limited to the following:
 - 1. USEPA Regulation 40 CFR Part 280, Underground Storage Tanks: Technical Requirements Final Rule and Office of Emergency and Remedial Response, Standard Safety Guides, PB92-983414.



2. New York City Fire Department, FP Directive 3-73 Division of Fire Protection, NYCAC Title 27, New York City Fire Prevention Code, Chapter 4 et seq., and Rule 21-02 of the City of New York. NYS Uniform Fire Prevention and Building Code (UFPBC) 1164.5.
3. NYS Department of Environmental Conservation (DEC)-Subdivision 6 NYCRR Part 613.9 (b) (DEC's Petroleum Bulk Storage (PBS) Regulation.
4. NYSDEC Petroleum Bulk Storage Regulations 6 NYCRR Part 613.9(b).
5. 6 NYCRR Part 360, Solid Waste Management Facilities, July 14, 1985.
6. 6 NYCRR Part 364, Waster Transporter Permits, January 10, 1985.
7. 6 NYCRR Part 371, Identification and List of Hazardous Waste, July 1, 1986.
8. 6 NYCRR Part 375 Environmental Remedial Programs, December 14, 2006.
9. NYSDEC, Ambient Water Quality Standards and Guidance Values.
10. NYSDEC Site Assessment at Bulk Storage Facilities, August 1, 1994, SPOTS Memo No 14.
11. NYSDEC Petroleum-Contaminated Soil Guidance Policy, August 1992, STARS Memo No. 1.
12. Rule 21-02 of the City of New York.
13. The 2014 New York City Building Code.
14. 29 CFR 1910 – Federal Occupational Safety and Health Administration (OSHA) standards.
15. NIOSH Occupational Safety and Health Guidance manual for Hazardous Waste Site Activities.
16. 29 CFR 1926 – Federal Construction Standards.
17. Resource Conservation and Recovery Act, 40 CFR Parts 260-265, Safe Entry and Cleaning of Petroleum Storage Tanks.
18. National Fire Prevention Association, Volume 30, “Flammable and Combustible Liquids Code.”
19. National Fire Prevention Association, Volume 327, “Cleaning or Safeguarding Small Tanks and Containers without Entry.”
20. US Department of Transportation (US DOT) 49 CFR Section 172.500 et seq.
21. American Petroleum Institute, API-2015A, “A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning.”
22. American Petroleum Institute, API-2217A, “Guidelines for Work in Inert Confined Spaces in the Petroleum Industry.”



23. American Petroleum Institute, API-2015, “Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks.”
 24. American Petroleum Institute, API-2016, “Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks.”
 25. American Petroleum Institute, API-1604, “Closure of Underground Petroleum Storage Tanks.”
 26. American National Standard Institute, ANSI 22882, “Standard Practice for Respiratory Protection.”
 27. American Society of Testing Materials, ASTM D 5088 (1990), Decontamination of Field Equipment Used at Non-radioactive Waste Sites.
 28. National Institute for Occupational Safety and Health, NIOSH, “Working in Confined Space.”
 29. Department of Transportation 49 CFR 172 through 179
 30. Department of Transportation 49 CFR 387 (46 FR 30974)
 31. Department of Transportation DOT-E 8876
 32. Environmental Protection Agency 40 CFR 136 (41 FR 52779)
 33. Environmental Protection Agency 40 CFR 262 and 761
 34. Resource Conservation and Recovery Act (RCRA)
 35. NYCDEC, Rules of the City of New York (RCNY), Title 15, Chapter 19, Use of the Public Sewers.
 36. NYCDEP, Limitations for Effluent to Sanitary or Combined Sewers.
 37. NYCDEP, Dewatering Sampling and Testing Requirements.
- H. Any transporter of contaminated/hazardous materials must be licensed in the state in which handling and transportation must take place in accordance with all applicable regulations.
- I. Comply with OSHA (Occupational Safety and Health Administration) Standards and Regulations contained in Title 29 CFR Part 1910.120 “Hazardous Waste Operations and Emergency Response.”
- J. Comply with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).
- K. In case of conflict between regulations and specifications, the Contractor must comply with the most stringent requirements outlined in the applicable codes, regulations, and specifications.
- 1.6 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS
- A. Direct questions relating to the intent of the Specifications or Drawings, quality of work required



thereby, to the Commissioner, in the event of disagreement the Commissioner's interpretations becomes final, conclusive, and binding on all parties.

- B. In case of disagreement between Drawings and Specifications, or within either document itself, the better quality, greater quantity, the stringent standards, or more costly work must be included in Contract Price and the matter referred to Commissioner's attention.

1.7 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

1.8 SUBMITTALS

- A. Unless otherwise indicated, transmit all submittals to the Commissioner for review. Review and approval of submittals by Commissioner is required before proceeding with ordering, fabricating, or any work of this Section. Submittal review will be of concept only and will not in any way diminish or limit Contractor's responsibility for the quality and performance of the work. All material orders are the sole responsibility of the Contractor.

- B. All required certifications and permits pertaining to the work of this Section.

- C. At least two weeks prior to mobilization of any equipment or materials to the Site, submit satisfactory proof of Contractor or Subcontractor qualifications for performing the Work specified herein, and name of Contractor's Professional Engineer licensed in the State of New York. Submit resumes of all key personnel, including supervising engineers and drilling operators and foreman.

- D. Shop Drawings and Caisson Details:

- 1. Where the Contractor elects to modify the caisson design from that indicated on the Contract Drawings, the Contractor must submit full design calculations and details prepared by a Professional Engineer, licensed in the State of New York. The Contractor's design must meet the requirements of all applicable codes and specifications and must be suitable for attaining the referenced design load capacities indicated on the Contract Drawings including connection details to the superstructure. Shop drawings must indicate the clear distance from all adjacent structures. Shop drawings must be signed and sealed by the Contractor's Professional Engineer licensed in the State of New York.

- E. Submitted shop drawings and caisson details must indicate the following information:

- 1. Schedule of all applicable caisson types, sizes, and design capacities;
- 2. Dimensions and lengths of rock sockets;
- 3. Location of rock socket bond zone and dimensions;
- 4. Schedule of reinforcing steel with all applicable dimensions, weights, and grades of embedded steel shapes;
- 5. Welding and splicing details.

- F. Manufacturer's or supplier's documentation certifying that casing, core beams and reinforcement



steel conform to the requirements specified herein. This must also include mill certificates covering physical and chemical tests. All material must be delivered to the site with clear identification to link the materials to the certificates and tests.

- G. Submit all grout mix designs, laboratory test results, and supplier data. Grout mix designs must be prepared by a Professional Engineer, licensed in the State of New York.
- H. Certification for Examination of Site and Records: Before proceeding with the work, submit certification in an acceptable form, signed by the Contractor, stating that careful examination has been made of the site, existing structures, existing adjacent structures, records of utility lines, test boring records, soil samples, subsurface exploration reports, the Contract Drawings, and all other Contract Documents.
- I. Installation Equipment and Procedures:
 - 1. The type of equipment for installation of caissons, including but not limited to drill rig, proposed soil and rock drilling bits, drilling techniques, and methods for passing obstructions, permanent and temporary casing (if required). Review of the drilling equipment does not relieve the Contractor from the responsibility of properly drilling caissons, in a satisfactory condition, to the specified criteria, to achieve the design capacities specified herein.
 - 2. Installation procedures for the caissons including but not limited to: detailed sequence of construction; drilling of any required pilot holes; use of temporary casing; drilling of rock sockets; optical or geophysical imaging to evaluate rock quality and the presence of obstructions; cleaning of the caisson prior to concreting; placement of grout fill under tremie; and placement of reinforcing steel.
 - 3. Methodology and details for establishing and maintaining the accurate centerline (at the top of caissons) during drilling operations (i.e., guide walls, jigs, etc.).
 - 4. Methodology for identifying and clearing obstructions such as concrete, timber, boulders, etc. including any pre-drilling or pre-excavation and associated backfilling including proposed backfill materials.
 - 5. Methodology for removing any existing piles.
 - 6. Methods for sealing the caisson and preventing groundwater and sediment infiltration.
 - 7. Methods for advancing the rock socket and removing spoils.
 - 8. Methods for cleaning the bottom of the rock socket.
 - 9. Methodology for maintaining a stable bottom during drilling including use, type, and estimated quantity of any mineral (i.e., bentonite) or polymer slurry products.
 - 10. Methodology to stabilize the borehole during drilling in the event that bottom heave or running sands are observed including temporary backfilling procedures and materials.
 - 11. Methodology and all necessary shop drawing for templates to ensure that the centerline location of rock sockets does not deviate more than 1 inch from the intended location.



12. Submit equipment for video inspection of rock sockets.
 13. Submit all materials data and procedures for the splicing of reinforcement and permanent and temporary casings.
 14. Submit detailed description of the tools and procedures for use in tremie placement of grout.
 15. Resumes of all welders to perform the work.
 16. Method of handling and disposal of drilling fluid and drilling spoils in compliance with soil management requirements.
 17. Corrective Action Plan: In the event that any tolerances specified herein are exceeded that necessitate abandonment or redrilling of caissons, the Contractor must prepare and submit a corrective action plan. The plan must include all pertinent means and methods to be employed in performing the corrective work.
 18. Submit procedures and supporting drawings and details pertaining to load testing including layout, and identification of test caissons.
 19. Submit product data sheets and calibration curves for all jacks, load cells, displacement transducers, and other test equipment.
- J. Caisson Identification Plan:
1. A plan clearly showing the designation and location of all caissons by an identification system, including the cut-off elevations for all caissons; location plan must be referenced to the Foundation Drawings. The plan must include the location of the centerline of each caisson referenced to a known benchmark and orientation.
 2. All detailed records for individual caissons must bear identification corresponding to that shown on the identification plan. A copy of this plan must also be available at the site for inspection at all times. The identification plan must be signed and sealed by a professional engineer licensed in the State of New York, and must be provided in electronic and hard copy formats.
- K. Survey:
1. Submit as-built survey plans prepared by a Professional Surveyor, licensed in the State of New York, showing the completed locations of the caissons at cut-off elevation with respect to the proposed locations. Survey must show actual locations of centers of caissons at top, made from accurate field surveys, with all other pertinent data. Caissons that exceed location tolerances specified herein must be highlighted and offset dimensions provided. As-built surveys must include a tabular summary of all data including: date of measurement; caisson ID; cut-off elevation; deviation measured in the north-south and east-west axes; and maximum percent inclination relative to the vertical axis. Surveys must be provided for review prior to installation of pile caps.
- L. Lateral Load Tests:
1. Prior to starting load tests, submit complete data on caissons, equipment, test locations, test



load frame, and test load procedures, including at a minimum:

- a. Relevant contractor experience with previous load tests
 - b. Caisson construction procedure, reinforcement and concrete strength
 - c. Caisson load reaction system
 - d. Details of instrumentation to be used
 - e. Details of any test caisson construction non-conformance and alternatives and corrective actions proposed
 - f. Typical report showing how the test data will be presented
 - g. Name and resume of full-time supervising Engineer for the testing
 - i) Type and accuracy of apparatus for applying load
 - h. Type and accuracy of apparatus for measuring load
 - i) Type and accuracy of apparatus for measuring deflection
 - i. Type and capacity of reaction load system, including drawings signed and sealed by a Professional Engineer licensed in the State of New York
2. Submit calibration reports for:
- a. Load cell
 - b. Test jack
 - c. Pressure gauge
 - d. Dial gauges.
 - e. Perform calibration tests by an independent testing laboratory with six months prior to the date submitted. Do not commence testing until all calibration has been accepted by the Commissioner.
3. Do not begin testing operations until the submittals have been accepted in writing by the Commissioner.

1.9 EXISTING UTILITIES

- A. Existing Utilities: Locate existing underground utilities within and beyond the areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during the work. Utilities scheduled for relocation are identified in the Contract Documents.
1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company immediately for directions. Cooperate with The City of New York and utility companies in keeping respective services and facilities in operation. Correct damaged utilities to satisfaction of utility company.



2. Do not interrupt existing utilities serving facilities occupied by City of New York or others, during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48-hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
3. Where necessary, demolish and completely remove existing underground utilities indicated to be removed from the site. Coordinate with utility companies for shutoff of services if lines are active.
4. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades

1.10 PROTECTION

- A. The work must be executed so that no damage or injury will occur to the existing public and adjoining or adjacent structures, streets, paving, sewers, gas, water, electric or any other pipes. Should any damage or injury caused by the Contractor, or anyone in Contractor's employ, or by the work under this Contract occur, the Contractor must , at own expense, correct such damage and must assume all responsibility for such injury
- B. The above must also include the protection of all existing utilities (including sewers, water lines, electrical lines and telecommunication lines) to remain in use within and adjacent to the area affected by the work of this project.
- C. Monuments, bench marks and other reference features on streets bounding this project, must be protected. Should these be disturbed in any manner, the Contractor must have them replaced at no cost to the City of New York.
- D. While performing work of this Section, or any other related Section, the Contractor must take care that any operations do not adversely affect the stability and integrity of existing buildings and structures in the vicinity, or induce settlement in them.
- E. Contractor will bear the responsibility for any damage to tunnels, buildings, structures, utilities, sidewalks, pavement, and other facilities in the vicinity resulting from the Contractor's operations and the Contractor must take whatever measures are necessary to prevent the same. Should damage occur because of Work under this Section, all costs in connection with the correction of such damage and the restoration of damaged construction to its original condition must be borne by the Contractor.
- F. Provide barricades, warning lights, barriers, etc., to prevent accidents, avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays and holidays.

1.11 ENGINEERING SERVICES

- A. Contractor must retain at its own cost, an engineer licensed in the State of New York and experienced with drilled caisson operations. Contractor's engineer must be a registered Professional Engineer in the State of New York. Contractor's engineer must design all drilled caisson work where alternates are proposed. Contractor's engineer must sign and seal all



submittals related alternates for drilled caissons and must be present at all meetings associated with this Work.

- B. When a modification to the caisson design is elected, the Contractor must submit the Professional Engineer's caisson design, plans, and details, as specified herein, for review by the Commissioner.

1.12 SURVEYING

- A. Contractor must retain at its own cost, a land surveyor to perform all necessary field layout, monitoring, and to document as-built conditions. The Contractor's surveyor must be a New York State Licensed Land Surveyor. Non-licensed surveyors will only be used to independently verify results provided by the licensed surveyor.

1.13 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Source Quality Control: Contractor's material control procedures must be effective and must assure that all Work fulfills the requirements of the project as well as the applicable provisions of the Contract Documents.
- C. Contractor performing the Work of this Section must demonstrate that the firm and their personnel they intend to use for this project have recent successfully completed projects installing drilled caissons of the type, size and scale as those specified for this project. The staff for this project must include a supervising engineer with experience in the installation of drilled caissons. Drilling operators and foremen must have experience installing drilled caissons.
- D. All labor, materials, equipment and services necessary to make the Work comply with such requirements must be provided without additional cost to the City of New York.
- E. Contractor must procure and pay for all permits and licenses required to complete the Work of this Section.

1.14 QUALITY CONTROL - INSPECTION AND TESTING

- A. Special Inspection:
 - 1. The City of New York will engage, under the requirements of Section 1704.1 of the Building Code, one or more qualified Special Inspectors to observe and provide all necessary material testing related to the work of this Section. All inspections and all materials testing must be performed by Special Inspectors meeting the minimum qualifications outlined in RCNY 101 06.
 - 2. Caisson installation must be observed on a full-time basis by the City of New York's Special Inspector(s). Contractor must arrange for Special Inspector(s) to be on the site during caisson installation to verify that caissons are installed in accordance with design requirements and to perform any requisite materials testing.
 - 3. The Special Inspector(s) must prepare and submit daily reports summarizing the construction and/or material testing activities to the Commissioner for review.
 - 4. The Special Inspector(s) must submit detailed logs and test reports necessary to facilitate



any corrective design requirements by the Commissioner. The contents and format of all logs must be as directed by the Commissioner.

5. Where work is observed to be non-conforming, the Special Inspector must immediately inform the Commissioner of such conditions in writing. A summary of the observed non-conformance must be issued within 24 hours. The Special Inspector must maintain a tracking log of all non-conformances and must update the tracking log on a daily basis such that corrective measures, if required, can be facilitated in timely fashion. The tracking log must include such information as ID number, date opened, description of non-conformance, actions required, actions taken, and date closed.
6. The Special Inspector must provide all necessary certifications of the work in compliance with Building Code requirements.
7. When a suitable bottom is presumably reached in each caisson, the Special Inspector must determine if the caisson socket length is suitable and the bottom is suitably cleaned. Before placement of grout, the socket and any casings must be thoroughly cleaned and the rock inspected to verify that the rock is of the class on which the design has been predicated, or of a better class. Cleaning with buckets, water flush or air lift may be performed, as required.
8. Visual inspection will be made by down-hole digital video camera by the Contractor under the direction of the Special Inspector to determine the class of rock in the socket. The video recordings must clearly identify the caisson ID #, and separate files must be generated for each caisson inspected. If video inspection is not possible, the Contractor must provide other means to allow the Special Inspector to assess the rock socket (i.e., borings, geophysical methods, etc.). Alternative means to verify rock sockets may be subject to the approval of the Commissioner.
9. The Special Inspector must keep detailed records, including items completed each day, job and weather conditions, a log of each caisson drilled with soil or rock strata encountered, water entry and flow, drilling difficulties, fluid loss, obstructions, casing size and location, bottom cleanout and water removal, description of bearing material, depth and size of shaft, plumbness, location of center of caisson with respect to design location (survey by Contractor), top of caisson elevation (survey by Contractor), placement of steel reinforcement, size of reinforcement, location and types of splices for casings and reinforcement, concreting, grouting, and any other pertinent construction details. These records must be provided to the Commissioner, and others as directed.
10. The Special Inspector(s) must document all welding performed for steel casings and reinforcement. These records must be provided to Commissioner on a daily basis, and others as directed.
11. Grout Placement and Testing:
 - a. With respect to grout filling of caissons, the Special Inspector(s) will (with the Contractor's assistance) verify that the actual volumes of grout placed into the caissons are within the established acceptable criteria.
 - b. Grout testing must be as required in Specification Section 033000: Cast-in-Place Concrete and as specified herein. Grout testing must be performed by the Special



Inspector(s). As a minimum, six grout cylinders must be obtained per 25 cubic yards of grout placed; at least six cylinders must be obtained for each day of grout placement, and not less than one set of cylinders must be obtained for each caisson. The samples must be tested in accordance with ASTM C109. If the required design strength is not attained, caissons may be subject to rejection. The Contractor is responsible to install replacement caisson(s) as required at no additional cost to the City of New York.

- c. Only cylinders, or steel or brass cube molds, should be used to collect grout samples.
 - d. The Contractor must provide the Special Inspector(s) with suitable storage space and initial curing facilities for grout test specimens.
12. The Contractor must have the sole responsibility for coordinating the work with the Commissioner to assure that all tests and inspection procedures required by the Contract Documents and the New York City Building Codes are properly provided by the Special Inspector. The Contractor must cooperate fully with the Special Inspector in the performance of the work.
 13. Materials and installed work may require testing at any time as work progresses. Allow free access to material stockpiles and facilities. Tests not specifically indicated herein may be performed at City of New York's expense, as required by the Special Inspector.
 14. Retesting of rejected materials and installed work is the Contractor's responsibility and must be performed at the Contractor's expense.
 15. The Contractor must notify the Commissioner and all other necessary parties at least 72 hours prior to each day of caisson drilling to allow for the appropriate personnel to be on the site.
 16. The role of the Special Inspector(s) will not relieve the Contractor from any responsibility with respect to conformance to the proper workmanship, management of materials and waste, or any other requirements of the Contract Documents.
 17. The Contractor must prepare and periodically submit to the Commissioner for review partial area surveys to facilitate the design of corrective measures.
 18. Upon completion and approval of all caisson drilling, the Contractor must deliver to the Commissioner the original as-built tracings (equal in size to that of the Construction Drawings) and the requisite copies for review and filing with the New York City Building Department.

1.15 PROJECT CONDITIONS

- A. The Project (Rodman's Neck Bomb Squad Headquarters (BSH)) is in Pelham Bay Park in the Bronx. The site is 56,000 square feet and occupies the entirety of New York City Block 5650 Lot 1. The site is on a peninsula extending south into the Hutchinson River between Eastchester Bay to the west and Pelham Bay to the east.
- B. Subsurface Conditions – The general subsurface conditions at this site consist of fill, soft organic clay, followed by a layer of medium dense sand. Below the sand was a layer of highly



decomposed rock that continued to the top of bedrock. The top of bedrock was encountered between about 23 and 35 feet below existing grade, corresponding to about el -15 to -27 (NAVD88). Bedrock sloped down within the site generally from north to south and east to west. Details regarding the subsurface conditions at the site are presented in the Geotechnical Report.

- C. Groundwater – Groundwater was typically measured to be between about el 5.2 (NAVD88). Groundwater can be expected to fluctuate with weather and seasonal conditions by as much as a few feet.
- D. Obstructions including timber, brick, boulders, and historical waterfront structures may be encountered during caisson installation throughout the site and must be assumed present by the contractor.
- E. The Contractor, by careful examination, must stay informed as to the nature and location of the work; the conformation of the ground, the nature of the subsurface conditions; the locations of the groundwater table; the character, quality, and quantity of the materials to be encountered; the character of the equipment and facilities needed preliminary to and during the execution of the work; and all other matters which can in any way effect the work.
- F. The Contractor must be held to have visited the site and to be familiar with the existing conditions of adjoining properties, utilities and buildings.
- G. Soil samples and rock cores are available for the Contractor’s review. The City of New York makes no predictions or representations regarding the character or extent of soil, rock, or other subsurface conditions to be encountered during the work. Additional borings and other exploratory operations may be performed by Contractor, at the Contractor’s option and following the City of New York’s approval. No change in the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.
- H. The Contractor must investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations affecting transportation to, ingress and egress of the site of the work. The Contractor must conform to all New York City and State, and Federal regulations in regard to the transportation of materials to and from and at the job site and must secure in advance such permits as may be required.
- I. Existing Utilities: Locate existing underground utilities in and beyond the areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during the work.
 - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company immediately for directions. Cooperate with The City of New York and utility companies in keeping respective services and facilities in operation. Correct damaged utilities to satisfaction of utility company.
 - 2. Do not interrupt existing utilities serving facilities occupied by City of New York, during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
 - 3. Demolish and completely remove from site existing underground utilities indicated to be



removed. Coordinate with utility companies for shutoff of services if lines are active.

- J. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.
- K. Compliance with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).

1.16 PRECONSTRUCTION MEETING

- A. Prior to work on site, the Commissioner will arrange a series of meetings to discuss coordination and scheduling. Parties to be present: Commissioner, Testing Laboratory, Excavation subcontractor and subcontractor's Engineer and the Special Inspector. Review the earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

1.17 DAILY PLANNING MEETING

- A. Coordinate with the Commissioner to arrange for daily site meeting with Special Inspector to review all proposed work before the start of each shift.

1.18 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

- A. Deliver materials to the project site in such quantities and at such times to assure the continuity of caisson drilling operations, and to maintain the project schedule. Carefully handle caisson materials by means of rope slings or other means so as not to damage the materials.
- B. Casings and reinforcement must be stored in orderly groups above ground, sufficiently blocked to minimize bending stresses. Material exhibiting variations beyond specified limits must be considered distorted and must not be used in the work. Casing and reinforcement must each have unique identification tags confirming material lot number and origin.
- C. Concentrated loads, which occur during stacking or lifting, must be kept below the level that would produce permanent deformation or overstress of the material. Damaged material will be rejected from use in the performance of the work and must be removed from the site.

PART 2 – PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Minimum sizes and quantities of all steel reinforcement must be one #20 per full-length of each caisson
- B. Plates must conform to ASTM A572, Grade 50.
- C. Reinforcing bars must conform to ASTM A615, Grade 150.
- D. Bar couplers must develop the ultimate tensile strength of the bars without evidence of any failure.
- E. Centralizers must be fabricated from plastic, steel, or a material that is non-detrimental to the



reinforcing steel. Wood must not be used.

- F. The cover to all reinforcement must be not less than 1.5 inches. Spacers must be designed and manufactured using durable materials and fixed to the reinforcement cage at intervals not exceeding 10 feet.

2.2 STEEL CASING

- A. Minimum sizes for steel casings must be 0.625 inches thick, and 13.625 inches in diameter.
- B. Steel casing must be of suitable quality and must consist of rolled and welded pipe meeting ASTM A252 Grade 3.

2.3 GROUT

- A. Contractor furnished grout mixes must be in accordance with Section 033000 – Cast-in-Place Concrete.
- B. Grout must have a minimum 28-day unconfined compressive strength of 5 ksi.
- C. Source Changes: Should the source of an ingredient change, for any of the grout products specified herein, Contractor must redesign the affected mix and must resubmit all prior to incorporating such material into the work.

2.4 WELDING MATERIALS

- A. All welding materials must be consistent with the requirements of the metals to be welded.
- B. Welding materials must be stored to prevent contamination and degradation of electrodes, filler, or shielding materials as per the manufacturer's specifications.

2.5 EQUIPMENT

- A. Provide equipment, machinery, tools, and other apparatus for drilling, digging, pumping, and hauling. Provide ample standby equipment to prevent flooding, distortion, or caving so that work may be carried on without interruption.
- B. The drilling equipment must be capable of advancing and withdrawing the down the-hole-hammer in a slow, steady, continuous motion and must have sufficient torque and weight to advance the caisson to the required depths specified on the Contract Drawings without loss of ground.
- C. Provide adequate lighting to permit clear sight conditions in all work and access areas.
- D. Provide hoisting equipment of sufficient capacity to handle casing, reinforcing steel, and other materials.
- E. Provide sufficient equipment to completely clean bottom prior to concreting and reinforcement installation.
- F. Provide hoses of sufficient size and strength, grout pump, and connections required to perform tremie grout placement. Provide bottom flap valve or temporary rubber plugs necessary to prevent



mixing of water and grout in the tremie pipe.

- G. Caisson Inspection Video Camera with pan and tilt Control.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 FIELD STAKEOUT

- A. Caissons must be staked out in the field by a New York State licensed Land Surveyor and must be verified independently by a second surveyor prior to commencement of drilling. The Contractor and Commissioner must meet on-site to review the proposed caisson locations and discuss any necessary modifications before drilling commences.

3.3 PRE-EXCAVATION AND USE OF TEMPORARY CASING

- A. Excavation and use of temporary casing for clearing obstructions, or otherwise, must not be performed without the approval of the Commissioner.
- B. All soils disturbed by excavation or pre-drilling must be properly compacted, or improved by grouting or other means acceptable to the Commissioner to prevent reduction of lateral resistance.
- C. Any annulus created through the removal of existing piles or the use of oversized temporary casing or by overcutting drilling methods must be filled with grout or other cementitious fill suitable to the Commissioner. The annulus must be filled prior to removal of temporary casing and the fill level must be topped off following removal of the temporary casing.

3.4 DRILLING, CONCRETING, AND PLACEMENT OF REINFORCEMENT

- A. The Contractor must drill all caisson sockets a minimum 8.5 inches in diameter, 6.5 feet long, in NYCBC class 1c or better material. Methods of construction must be as specified herein, but the Contractor is solely responsible for the adequacy of all operations.
- B. Caisson drilling equipment must have the minimum torque capacity and downward force capacity for the site conditions to install the caissons to the required depth. Selection of equipment must be the sole responsibility of the Contractor.
- C. Where required, casings must be advanced ahead of the drill stem, and a soil plug of at least 2 feet must be maintained until the casing is seated into bedrock. Drilling fluids, including but not limited to, water, mineral slurry, or polymer slurry must be provided as necessary to ensure a stable bottom throughout drilling. All methods employed must be as described in the Contractor's method statement.
- D. The Contractor's drilling methods must prevent inflow of soils from beyond the shaft limits (i.e., running sands, etc.) which can result in erosion, destabilization, and subsidence.
- E. External flushing of the casing during drilling must not be permitted.
- F. The Contractor must advance the rock socket to the minimum required depth and diameter shown



on the Contract Documents. The drilling method should produce a rough surface on the side walls of the rock socket.

- G. As soon as the required rock socket length is reached the Contractor must clean the caisson bottom of all loose material, and notify the Commissioner and Special Inspector, who will determine the actual bottom depth. The socket lengths indicated on the Contract Drawings are approximate, and may be adjusted by the authorized representative depending on the conditions of rock encountered. The caissons must be advanced into bedrock to obtain required socket length necessary for achieving the intended design load as determined by the Special Inspector.
- H. Down-hole digital video camera must be performed by the Contractor to allow inspection of the rock socket by the Special Inspector. Caissons must be flushed with clean water to remove sediment so that the side walls and bottom of the rock socket can be video inspected. Where conditions prevent the use of down-hole video, the Contractor must provide alternative means to establish the quality of rock within caissons including but not limited to drilling of test borings with rock coring and associated geophysical testing. Where borings are to be used in lieu of down-hole video, borings must be performed using methods acceptable to the Commissioner and must be taken prior to full scale caisson drilling (at the center axis of the element).
- I. If the Special Inspector's inspection indicates that the rock is not capable of providing the required design capacity, the shaft length must be advanced as directed by the Special Inspector, in consultation with the Commissioner, and the above steps repeated, unless other recommendations are made by the Commissioner.
- J. After shaft walls and bottom have been inspected and shown to comply with the Contract Documents, caissons must be reinforced and filled immediately with grout.
- K. Reinforcing steel must be clean and free of foreign matter that may adversely affect bond. All reinforcing steel must be centralized within the borehole and the minimum cover shown on the Contract documents must be maintained. Steel must be braced temporarily as required to facilitate making any required field splices and to maintain reinforcement in a suitable alignment.
- L. Steel reinforcement and centralizers must be lowered into the cased holes to the desired depth without difficulty. Partially inserted steel must not be driven or forced into the hole.
- M. Centralizers must be located a maximum of 5 feet below the cut-off level from the top of the caisson, and the bottom centralizer must be located a maximum of 5 feet from the bottom of the rock socket. The maximum spacing of the centralizer must be 10 feet. The Centralizers must permit the free flow of grout without misalignment of the reinforcement.
- N. Grout must be continuously placed by methods that ensure against segregation and dislodging of excavation sidewalls and must completely fill the shaft. Grout must be placed by tremie unless otherwise approved by the Commissioner. The discharge must be kept a minimum of 6 feet below the fresh grout surface during placement. Grout must be pumped until fresh grout is observed to be continuously discharging from the top of the caisson.
 - 1. Reinforcing steel must be placed within a maximum of 72 hours after the completion of the drilling of the rock socket unless otherwise approved by the Commissioner.
 - 2. Grout must be placed within 2 hours after installing the reinforcing steel unless otherwise approved by the Commissioner.



- O. Drilling of caissons must not be permitted within 20 feet of grout that has not cured for at least 24 hours, and within 10 feet of grout that has not cured for at least 3 days, unless otherwise approved by the Commissioner.
- P. A maximum of 2 inches of sediment will be permitted to accumulate at the bottom of the rock socket after video inspection and prior to grout placement. The Contractor must flush the rock socket immediately prior to placing grout to suspend sediment accumulated in the bottom of the socket. The Contractor must remove sediment greater than 2 inches prior to grout placement.
- Q. Grout must be placed using underwater tremie techniques only after water flow has stabilized.
- R. A rubber plug or other temporary separation device must be utilized to prevent mixing of water and grout in the tremie pipe. Tremie pipes must be removed from the caisson following grout placement unless otherwise approved by the Commissioner.
- S. Reinforcing steel must be centralized and braced as necessary to remain within proper alignment until grout has set.
- T. Grout must be brought to a true level surface inside the shaft and a full width cross key formed or dowels installed should it become necessary to interrupt placing grout in any caisson. Prior to placing additional grout, clean surface of laitance and slush with 1:1 Portland cement grout. The grout must have a water cement ratio not exceeding that of the grout.
- U. No extra payment will be made to the Contractor for overcoming of obstructions under any condition whatsoever.
- V. During drilling of caissons, all openings must be properly protected and covered when work is not in progress. Prevent debris from being dislodged in the caisson and grout. Suitable lights and barricades must be provided as required.

3.5 CAISSONS CUT OFF

- A. Caissons must be cut-off in a neat and workmanlike manner to the elevations given or implied from the drawings. Cutting must be done with approved equipment that will not damage the area below the cut surface.
- B. Where caissons are cut-off below the stipulated elevation, and where accepted by the Commissioner, the caisson cap may be both lowered and thickened so as to properly engage the caisson.
- C. Removal: Caissons cut material, regardless of length or volume, will be the property of Contractor, and must be disposed of in a legal manner. All debris resulting from excavation and drilling, removal of obstructions, and any material not to remain as part of the construction is to be removed and disposed of off-site by Contractor in a legal manner. The site must be cleaned at frequent intervals and no material can be stored on the site in a manner that would obstruct the easy access of equipment and personnel. Stock piling of material will not be permitted except where accepted by the Commissioner.

3.6 LOAD TESTING

- A. Axial Load Testing: None Required



B. Lateral Load Testing

1. Perform a minimum of six successful lateral load tests for the mini-caissons at the pile cut-off elevation.
2. Perform a minimum of two successful lateral load tests for the caissons at the pile cut-off elevation.
3. Load tests must be performed at locations selected by the Commissioner.
4. All load tests must be performed in accordance with ASTM D3966 and evaluated in accordance with the NYC Building Code.
5. Load tests must be administered by the Contractor and must be observed by the Special Inspector. The Special Inspector must record all load test data.
6. Load Schedule - The load schedule must be as follows (DL = Design Load):

Load (tons)	Hold Period
0.25 DL	10 min
0.5 DL	10 min
0.75 DL	15 min
DL	20 min
1.25 DL	20 min
1.5 DL	20 min
1.7 DL	20 min
1.8 DL	20 min
1.9 DL	20 min
2 DL	60 min
1.5 DL	10 min
DL	10 min
0.5 DL	10 min
0	10 min

7. Load and Deflection Measurements
 - a. Load cells must be used in series with the hydraulic cylinders to measure load. The load at the given load increment is to be governed by the readings from the load cell



- and not the equivalent pressure as read from the pressure gauge attached to the pump.
- b. Measure pile head movement with dial gauges capable of reading to the nearest 0.001 inch. Dial gauges must have a travel of at least 3 inches. Dial gauges must be mounted on an independent steel test frame to prevent relative movement during the load test.
 - c. Establish a separate mirror, wire, scale set-up, with scale capable of measuring to the nearest 0.025 inch.
 - d. Provide independent survey level measurements of the pile using optical level survey equipment capable of reading to the nearest 0.005 ft. The survey datum must be located so that it is not affected by either the test loading or the other site operations.
 - e. Load cells must be used in series with the hydraulic cylinders to measure load. The load at a given load increments is to be governed by the readings from the load cells and not the equivalent pressure as read from the pressure gauge attached to the pump.
8. Allowable Design Capacity
- a. The allowable design capacity must be: Fifty (50) percent of the applied lateral load resulting in 1 inch of gross lateral movement measured at the pile head.
9. Test Procedures
- a. Supervision: The installation of the entire testing system, testing and monitoring, are to be carried out in the full-time supervision of the Contractor's engineer experienced in caisson installation and testing.
 - b. Delay between installation and Testing: Loading testing of caissons must not commence until the strengths of materials are adequate to sustain the maximum required test load specified.
 - c. Load application: upon loading of each test caisson to the maximum test load, the load must be removed smoothly and the residual movement recorded.
 - d. Recording during loading states: the load, deflection and time must be recorded immediately upon reaching the load increment and at intervals in accordance with ASTM D3966. Should it not be possible to achieve the load increment, readings should be taken as directed by the Commissioner.
10. A detailed report must be prepared by the Special Inspector and must be submitted for review by the Commissioner. The load test report must include but not be limited to the following information:
- a. Caisson ID, design loads, geometry, and materials
 - b. Description of installation methods and equipment
 - c. Description of subsurface information including boring and testing logs



- d. Caisson installation logs and notes
- e. Description and details of test apparatus and methods
- f. Elevations and datum
- g. Concrete strength at time of testing
- h. Test data and notes pertaining to each test
 - i) Evaluation and rated capacity per NYC Building Code acceptance criteria.
11. Caissons tested as pairs by pushing or pulling one another will be considered a single load test, unless otherwise acceptable to the Commissioner.
12. Caissons not meeting the prescribed design loads must be immediately brought to the attention of the Commissioner.

3.7 MONITORING

A. Verticality

1. Inclination of the casing must be checked prior to initiation of drilling by optical surveying techniques or as approved by the Commissioner. The plumbness measurement must be provided to the Special Inspector and Commissioner prior to commencing with drilling. Initial deviation from vertical must not be greater than 1 percent prior to proceeding with drilling.

3.8 TOLERANCES

- A. Shafts must be vertical and with minimum diameter as indicated on the Contract Drawings or as approved by the Commissioner.
- B. Maximum permissible deviation of center of top of any caisson from required location at cut-off is 1 inch. Shafts must not be out of plumb more than 1% of shaft length, based on the final centers at top and bottom of caisson. Tolerances must be determined in the field by optical survey, performed by a Licensed Surveyor retained by the Contractor.
- C. Maximum permissible deviation of rebar cages from the as-built center of the caisson is 0.5 inches. Distribution and placement of rebar must meet the standard tolerances described in ACI 318-11.
- D. Tolerances must be determined in the field by optical survey, performed by a Licensed Surveyor retained by the Contractor.
- E. Damaged caissons, and caissons drilled outside the required drilling tolerances, will not be accepted.
- F. Caissons rejected after drilling must be cut-off and additional caissons drilled to replace the lost capacity as required by the Commissioner.
- G. If tolerances are exceeded, design and furnish, at no additional cost, all additional or corrective



construction to compensate for excessive eccentricity. Corrective construction must be submitted for approval by the Commissioner.

- H. The Contractor is responsible for all costs associated with review of such calculations and corrective construction by the Commissioner.
- I. Approvals: The Special Inspector will make final approval of caisson shaft holes and authorize subsequent grout placement.

3.9 SEQUENCE OF WORK

- A. Drilling of caissons must be performed so that reinforcing steel and grout placement is a continuous operation performed the same day that the excavation is completed, and in no instance greater than 72 hours following excavation, unless otherwise approved by the Commissioner.
- B. Grout must be placed within 2 hours after placement of reinforcement, unless otherwise approved by the Commissioner. The Contractor must flush the rock socket immediately prior to placing grout to suspend sediment accumulated in the bottom of the socket.

3.10 UNACCEPTABLE CAISSONS

- A. Unacceptable caissons are caissons that are rejected by the Special Inspector or Commissioner because of non-conformance including damage, failure to advance through obstructions, mislocation, misalignment, failure of socket inspection, failure to install the caisson using the approved equipment and procedures, or failure to install the caisson to the proper depth.
- B. Submit a written plan of action to the Commissioner for approval, showing how to correct the problem and prevent its reoccurrence.
- C. Correct or augment the caisson to the satisfaction of the Commissioner to make it acceptable. To mitigate and remedy unaccepted caissons, Contractor may be required to provide additional caissons or supplement caissons to meet specified requirements at no cost to the City of New York.
- D. The Contractor is responsible for all costs associated with review of such calculations by the Commissioner and corrective construction.

3.11 GROUT TESTING

- A. Coordination with Testing Agency: The Contractor has the sole responsibility for coordinating their work with the testing agency to assure that all test and inspection procedures required by the Contract Documents and the Department of Buildings are provided. The Contractor must cooperate fully with the Testing Agency in the performance of their work.
- B. Duties of the Testing Agency:
 - 1. Reports: The Testing Agency must prepare daily reports of the grout work including progress and description/area of work, tests made and results. The daily reports must be provided to the Commissioner.
 - 2. Rejection: The Testing Agency has the right to reject any material, at any time, when it is determined that the material or workmanship does not conform to the Contract Documents.



The Testing Agency must report deficiencies to the Commissioner and Contractor immediately.

C. Source Quality Control:

1. The Testing Agency must conduct grout quality evaluations for compliance with Specifications as follows:
 - a. Review and test Contractor's proposed materials.
 - b. Review and test Contractor's proposed grout mix designs.
 - c. Secure and test production samples at plants or stockpiles.
 - d. Check batching and mixing operations to extent deemed necessary to assure compliance with Specifications.

D. Field Quality Assurance:

1. General: The Testing Agency must test and inspect grout materials and operations as work progresses. Failure to detect any defective work or material will not in any way prevent later rejection when such a defect is discovered, nor will it obligate the Commissioner for final acceptance.
2. Testing Agency is responsible for monitoring grout placement as follows:
 - a. Testing Agency must provide qualified personnel at site to monitor concreting operations.
 - b. Record temperature of grout at time of placement.
 - c. Record weather conditions at time of placement, including temperature, wind speed, relative humidity, and precipitation.
 - d. Record types and amounts of admixtures added to grout batches, including that added after departure of grout trucks from batch plant.
 - e. Record amounts of and monitor dosing of high-range water-reducing admixtures added at site for site-added admixtures and re-dosing for plant-added admixtures.
 - f. Monitor consistency and uniformity of grout.
 - g. Monitor preparation for concreting operations, placement of grout, for conformance with Specifications.
3. Testing Agency must conduct tests of grout as follows:
 - a. Testing frequency: One sample set for all tests listed below must be taken at each caisson. Each set must have a minimum of 7-samples.
 - b. Obtain each test sample from different batches selected on a strictly random basis before commencement of grout placement. Record location in structure of sampled



grout.

- c. Determine air content of normal weight grout in accordance with either ASTM C 231 or ASTM C 138.
 - d. Determine unit weight of normal weight grout in accordance with ASTM C 138.
 - e. Conduct strength tests of grout as follows:
 - i) Secure sample sets in accordance with ASTM C 172.
 - ii) Mold cylinders in accordance with ASTM C 31 and cure under standard moisture and temperature conditions in accordance with ASTM C 31, Section 7 (a).
 - iii) Mold cubes must be made of brass or stainless steel.
 - iv) Test cylinders in accordance with ASTM C 39.
 - v) For 28 day mixes mold seven cylinders. Test one cylinder at three days, two cylinders at 7 days, two cylinders at 28 days, and one cylinder at 56 days. The 28 day strength must be the average of the two 28 day cylinders. One cylinder must be retained in reserve for later testing if required.
 - vi) If one cylinder in a test manifests evidence of improper sampling, molding or other damage, discard cylinder and base test results on that of remaining cylinder.
4. Testing Agency must evaluate grout for conformance with Specifications as follows:
- a. Strength test:
 - i) Testing Agency must maintain a compressive strength moving average, comprised of three consecutive strength test results, for each mix design used in Work.
 - ii) Strength level of grout will be considered satisfactory provided averages of all sets of three consecutive strength test results (i.e. moving average) equal or exceed specified 28-day strength, and no individual strength test result falls below specified 28-day strength by more than 500 psi.
 - iii) If strength tests fail to meet minimum requirements at 56 days (or longer for the reserve cylinders, grout represented by such tests must be considered questionable. The Commissioner may require the Contractor perform a core drill of the full depth of the caisson for quality examination and strength testing of core specimens.
 - iv) Grout samples must be molded, cured in a properly constructed curing box supplied by Contractor.
 - v) If the strength requirement is not met, Contractor must modify the proportions of the mix subject to the approval of the Commissioner. If the required design



strength is not attained after 28 days, then the Contractor must install replacement caisson(s) as required at no additional cost to the City of New York.

- E. If agitated continuously, the grout may be held in the truck for a period not exceeding two hours at temperatures below 70 degrees Fahrenheit and for a period not exceeding one hour at higher temperatures.
- F. Re-tempering of grout will not be permitted.

3.12 SPECIAL INSPECTION

- A. No work will be performed without the presence of the Special Inspector. The Contractor must notify the Special Inspector and the Commissioner a minimum of 72 hours prior to start of caisson installation and video inspection work.
- B. The Contractor must cooperate with the Special Inspector to facilitate the progress of inspection work. If the Contractor fails to cooperate with the Special Inspector, the Special Inspector must bring the matter to the attention of the Commissioner.
- C. Rock Socket Inspection
 - 1. Video inspection of caisson rock sockets must occur in the presence of the Special Inspector.
 - 2. Contractor must provide all necessary equipment and personnel to perform rock socket inspection via video camera.
 - 3. Rock socket video must be performed by the contractor, in the presence of the Special Inspector. The video file or CD must be provided to the Commissioner and Special Inspector within 48 hrs.
 - 4. Defects in the sockets must be addressed to the Commissioner's requirements. Contractor must correct all defects at no additional cost to the City of New York.
 - 5. The bottom of the rock sockets must be visible during video inspection.
 - 6. All sockets must be video inspected before placement of reinforcement steel and grout.

3.13 CLEAN-UP

- A. All excess material, including earth, rock and fill, must be removed from site and legally disposed of. Material handling and disposal must be in accordance with the Contract Documents
- B. All lumber, forms and metal work must be removed immediately after completion of local areas. The Contractor is responsible for removal of all debris produced by work to this section from the site.
- C. Sidewalk and streets adjoining the property must be broom cleaned and free of debris, rubbish, trash and obstructions of any kind caused by the work of this Section.

3.14 CLOSEOUT



A. Substantial Completion Requirements:

1. Provide final cleaning immediately prior to Substantial Completion inspection.
2. Corrective Work:
 - a. Remove, correct and reinstall, or restore in place damaged items.
 - b. Replace damaged materials or items with New if correction not acceptable to Commissioner.
3. Provide product data to complete Operation & Maintenance Manuals.

3.15 WASTE MANAGEMENT

- A. Separate and dispose of waste in accordance with the Project's Waste Management Plan.

END OF SECTION 31 64 00



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SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:

Open-graded stone base must consist of the furnishing and placing of broken stone in the places designated on the plans, and in such other locations as field conditions require. The thickness and locations of the “open-graded stone base” must be shown on the plans, or as determined by field conditions and ordered by the Commissioner.

1.3 INTENT

- A. This section describes the construction of an open-graded stone base.

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials for this work must be of sound, clean, hard, durable freshly broken unweathered stone not contaminated with clay and free from any organic or other deleterious material. Prior to the placement of any base material, the Contractor must submit a representative sample to the Commissioner and obtain approval, in writing. The material must meet the following gradation requirements unless otherwise specified by NYSDOT specifications:



Sieve Size	Percent Passing (By Weight)
1 inch	100
3/4 inch	65-90
3/8 inch	45-75
No. 4	30-55
No. 100	4-15

- B. The quality of the stone particles must be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss at 4 cycles, by weight, must be 20.
- C. Should, at any time during the work for any reason, the material fail to conform to the specified quality and gradation requirements, the Contractor must by the addition of selected acceptable material, and/or satisfactory manipulation, produce a material meeting the above requirements.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 METHODS

- A. The material must be spread in equal thickness layers. The spreading of any layer of this material must be done with spreader equipment approved by the Commissioner, and must be spread to such thickness that the maximum depth of the layer, after compaction, will be 6 inches. Spreading from piles dumped on the roadway will not be permitted. No segregation of large or fine particles will be allowed, but the material, as spread, must be well graded, with no pockets of fine material. Water must be added in such amounts as the Commissioner may consider necessary to obtain satisfactory compaction.
- B. When the moisture content if the layer is within the limits for proper compaction, the entire surface must be rolled with a pneumatic tired roller, having an operating weight of between 1,000 and 2,500 pounds per tire, or a smooth steel wheel roller, having a minimum weight of (10) tons. Each portion of the layer must be covered by a minimum of eight (8) passes of the roller.
 - 1. For heavier vibratory or more efficient types of approved compaction equipment, the minimum number of passes required on all portions of each layer must be determined by the Commissioner after appropriate field tests to evaluate the efficiency of such equipment. In limited areas, where the use of a roller is impractical, approved vibrating plate compactors or impact rammers must be used to compact the material.
- C. After compaction, the top surface of this base must not extend above, no more than ½ inch below, true grade and surface at any location. The base, at any location, must be compacted, finished and completed to the above tolerance and approved by the Commissioner, before any succeeding pavement course is placed at the location. Any depressions or holes must be filled



with approved coarse sand or screenings and the surface re-rolled. In all cases, this stone base must be so thoroughly compacted that it will not weave under the roller.

- D. The width of the layer of this base must be restricted to that required for placement of the lane being paved and must not be laid in excess of 500 linear feet without being compacted. No traffic or hauling other than that necessary for bringing material for the next course, must be permitted over this base. Should the subgrade, subbase, or any other material become churned up into or mixed with this base, for any reason whatsoever, the Contractor must, at own expense, remove such mixtures and replace with open-graded stone acceptable for this Section.
 - 1. The Contractor must assume full responsibility for any contamination and/or degradation of any part of this base during construction and must, at own expense, remove any and all portions of this base which do not conform to the requirements of these specifications and replace these portions with specified material.

- DI. Where indicated on the plans, an asphaltic tack coat must be applied to the surface of the stone base course for bonding to an overlying asphaltic concrete wearing course. Tack coat must be as per Section 321213.13 of these Specifications.

END OF SECTION 32 11 23

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SECTION 32 11 36

CONCRETE BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. The construction of a concrete base for roadway pavements as shown on the plans and in accordance with NYCDOT Standard Specification, and as directed by the Commissioner.
 2. Concrete Pavement areas within NYSDOT jurisdiction to follow NYSDOT Standard Sheets and Specifications.

1.3 RELATED WORK

- A. Related work is described in the following sections of the specifications:
1. Section 32 12 19: Asphaltic Paving Wearing Course
 2. Section 32 12 13.13: Tack Coats

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. The Contractor must submit material certifications and concrete mix designs as required by NYSDOT and NYCDOT Standard Specifications to the Commissioner for review and approval prior to starting work.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For areas within NYCDOT jurisdiction, all material must comply with Section 4.04 of NYCDOT Standard Specifications, Concrete must be Class B-32, type IA using Type I Portland cement, per Section 3.05.
- B. For areas within NYSDOT jurisdiction, follow NYSDOT Standard Sheets and Specifications.

2.2 INSERTS IN CONCRETE SUB-SLAB

- A. Diamond shape plate dowel - epoxy coated dowel with debonding material.
- B. Dowel basket - uncoated steel.
- C. Smooth dowel – round dowel provided with one debonded end cap.
- D. Reinforcing Wire Fabric: Galvanized, welded wire fabric, as indicated on drawings; comply with ASTM A 185/A 185M and ASTM A 82/A 82M except for minimum wire size.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 METHOD

- A. For areas within NYCDOT jurisdiction, the concrete roadway base paving must be 8" thick NYCDOT Class B-32 concrete or as shown on plans; cement must be Type I Portland. An approved air-entraining agent must be added at the time concrete ingredients are mixed with water. The concrete base must be finished three (3) inches below the surface of the new asphaltic concrete wearing course within a tolerance of $\pm 1/4$ inch throughout. The finished surface must be struck uniformly and be free of ruts, depressions, bumps and unevenness, suitable for temporary use as a vehicular riding surface and for the application of reflective cracking membrane under NYCDOT Specification Section 6.91. Also, transverse roadway joints must be sawcut every 20 feet as shown on NYCDOT Standard Drawing H-1040. Concrete base paving work and materials must comply with Section 4.04 of the NYCDOT Standard Specifications and with NYCDOT Standard Drawing Nos. H-1040 and H-1042A.
- B. For areas within NYSDOT jurisdiction, follow NYSDOT Standard Sheets and Specifications.

3.3 TESTING

- A. The City of New York will engage the services of an approved testing laboratory for Special Inspection to determine the in-place density of the soil after compaction is completed. All proctor analyses of soils and in-place density testing must comply with the requirements of NYSDOT specifications and Section 7.12 of the NYCDOT Highway Specifications.
- B. Concrete materials and operations must be tested and inspected as the work progresses.
- C. The Contractor must retain the services of an independent testing lab, licensed in New York State, to provide inspection services at the site during mixing and placement of all pours, prepare concrete cylinder samples, test cylinders for compressive strength and to provide test reports of the results. The testing lab representative must record the concrete slump, air content, concrete temperature and the concrete unit weight and yield for each set of cylinders taken and for each truck delivery. The Contractor must provide adequate facilities (heated, insulated curing box, etc.) on the project site for the safe storage and proper curing of the test cylinders for the first 24 hours, prior to transport to the testing lab.
- D. Sampling and testing must comply with NYSDOT Specifications and Standard Sheets as well as Sections 5.01, 5.02, 5.03 and 6.72 of the NYCDOT Standard Specifications.

END OF SECTION 32 11 36

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SECTION 32 12 13.13

TACK COATS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Furnish and install pavement tack coat on concrete bases and between bituminous layers in accordance with NYSDOT and N.Y.C.D.O.T. Standard Specifications as directed by the Commissioner.

1.3 RELATED WORK

- A. Related work is described in the following sections of the Specifications:
1. Section 32 12 19: Asphaltic Paving Wearing Course

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit material certificates.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Material to comply with NYSDOT Standard Specifications. Where applicable, Liquid Asphalt (RC -70), Emulsified Asphalt (RS-1) or Asphalt Cement (AC-20) complying with the requirements of N.Y.C.D.O.T. Standard Specification Section 6.58A (Latest Revision) must be furnished and applied.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 METHOD

- A. Apply tack coat per latest NYSDOT Standard Specifications or latest revision of Section 6.58A of the NYCDOT Standard Specifications.

END OF SECTION 32 12 13.13

SECTION 32 12 19

ASPHALTIC PAVING WEARING COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Construct asphaltic concrete wearing course for roadways as shown on the plans and in accordance with NYSDOT Standard Specifications, N.Y.C.D.O.T. Standard Specifications, and as directed by the Commissioner.
 2. For areas under NYCDOT jurisdiction (and unless otherwise specified on plans), asphaltic concrete wearing course must consist of a binder mixture and a surface mixture, each 0.5 inches in thickness after compaction unless otherwise noted on plans or otherwise required by the NYSDOT Specifications. Additional binder mixture must be placed where required.

1.3 RELATED WORK

- A. Related work is described in the following sections of the specifications:
1. Section 32 12 13.13: Tack Coats

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Before the Contractor begins to manufacture the asphalt paving mixture, the Contractor must secure the Commissioner’s approval of the mix formula proposed for use. The Contractor must submit for this purpose a statement, in writing, of the sources of all ingredient materials, the penetration of the asphaltic cement and the percentages by weight and the number of pounds of each of the materials making up one batch.
1. The approved formula must not be changed without the written permission of the Commissioner.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials must comply with the requirements of NYSDOT Standard Sheets and N.Y.C.D.O.T Standard Specifications Section 4.02A, latest revision.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 SUMMARY

- A. Asphaltic concrete wearing course to be provided as specified on plans.
- B. For areas under NYCDOT jurisdiction (and unless otherwise specified on plans), the 1" thick asphalt concrete wearing course must consist of ½" (after compaction) of plant-mixed Marshall design high friction Type 6F RA asphaltic concrete surface course placed on ½" (after compaction) plant mixed Marshall design Type 3 RA binder base course. A tack coat must be applied to the concrete base pavement prior to asphalt placement. Work and materials must comply with the latest revision of Section 4.02A of the NYCDOT Standard Specifications and with NYCDOT Standard Drawing Nos. H-1040 and H-1042A.

3.3 METHOD

- A. Before any asphaltic mixture is laid, the surface must be thoroughly swept and cleaned of all dirt, loose and foreign matter, and be free from standing water. No mixture must be deposited unless the surface on which it is to be laid is in a condition acceptable to the Commissioner.
 - 1. Unless otherwise specified, shown on the plans or directed by the Commissioner, surfaces on which asphaltic mixtures are to be laid must be given a tack coat as specified under Section 321213.13.
- B. The maximum length of asphaltic mixture which can be placed by an approved mechanical spreader in a continuous strip must not exceed 800 feet, unless permitted, in writing, by the Commissioner. Adjacent strips must be laid, subject to the above limitations, immediately after each previous strip is placed until the full width of roadway surface has been covered in the said maximum or permitted length.



- C. Binder mixture must be furnished and laid by means of a mechanical spreader of approved design to a depth which after final compaction must be equal to the specific depth. In areas where the use of a mechanical spreader is impractical, as determined by the Commissioner, other approved means of spreading and compaction may be permitted.
 - 1. Where permitted by the Commissioner, hand laying must comply with NYSDOT and N.Y.C.D.O.T. Standard Specifications.
- D. The surface of the binder course must be kept as free from traffic as is possible under working conditions, be clean, free from water, and if necessary, swept off immediately before the surface mixture is laid. Binder must be covered with surface mixture as soon as practicable and in all cases not later than the same day, unless otherwise directed by the Commissioner.
- E. All contact surfaces of curbs, gutters, headers, manholes etc., must, before the surface mixture is laid, be well painted with a thin uniform coating of approved hot asphaltic cement or liquid asphalt or emulsified asphalt.
- F. Surface mixture must be furnished and laid by means of mechanical spreader of approved design to a depth which after final compaction must be equal to the specific depth. In areas where the use of a mechanical spreader is impractical, as determined by the Commissioner, other approved means of spreading and compaction may be permitted.
 - 1. Where permitted by the Commissioner, hand laying of the mixture must comply with N.Y.C.D.O.T. Specifications.
- G. Leveling course mixture, on reaching the street, must be dumped on approved dumping boards or steel plates and must be immediately deposited by means of hot shovels over the area to be leveled, built-up or adjusted. It must be uniformly spread by means of hot iron rakes to a thickness that will provide a surface, after final compaction, which must be a constant depth, equal to the specified thickness of wearing course, below the proposed final surface of the wearing course. Where practical, a mechanical spreader of approved design may be used.
- H. Rolling must proceed continuously within the time limit requirements and rates provided under NYSDOT Standard Specifications and N.Y.C.D.O.T. Standard Specifications. Rolling equipment must comply with NYSDOT and N.Y.C.D.O.T. Specifications.
- I. The surface mixture must be laid in as nearly a continuous operation as possible and the roller must pass over the unprotected end of the freshly laid mixture only when the laying of the course is to be discontinued for such length of time as to permit the mixture to become chilled. In all such case, including the formation of joints, as herein required, provision must be made for proper bond with new mixture by cutting or trimming back the joint so as to expose an unsealed or granular surface for the full specified depth of the course. At the end of each day's work on the mixture, joints must be formed by laying and rolling against boards of the thickness of the compacted mixture, placed across the entire width of the pavement or by such other method as may be approved by the Commissioner. When the laying of the mixture is resumed, the exposed edge of the joint must be painted with a thin coat of approved hot asphaltic cement or liquid asphalt, and fresh mixture must be raked against the joint and thoroughly tamped with hot tampers and rolled. Hot smoothing irons may be used for sealing jobs.
- J. Mixtures must be spread and compacted during daylight under acceptable weather conditions presented in NYSDOT and N.Y.C.D.O.T. Standard Specifications.

3.4 TRAFFIC

- A. No traffic of any kind will be allowed on the pavement until permitted by the Commissioner.

3.5 DEFECTIVE WEARING COURSE

- A. Such portions of the completed wearing course as are defective in finish, compression, composition, density or do not comply with the requirements of these specifications, must be taken up, removed and replaced with suitable material properly laid in accordance with these specifications.

3.6 FIELD QUALITY CONTROL TESTING

- A. The Contractor must employ a qualified independent testing laboratory to perform thickness and density tests and submit test reports in accordance with NYSDOT and N.Y.C.D.O.T. Standard Specifications.

END OF SECTION 32 12 19

SECTION 32 15 40

CRUSHED STONE SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contractor Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Crushed stone paving course for walkways and storage container areas, compacted with metal edge.

B. Related Sections:

1. Section 312333 "Trenching and Backfilling"
2. Section 321613 Curbs and Gutters
3. Section 329200 Turf and Grasses
4. Section 329300 Plants

1.3 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. American Association of State Highway and Transportation Officials:

1. AASHTO T 27 Sieve Analysis of Fine and Coarse Aggregates.

1.4 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures.

- B. Shop Drawings: Submit plan layout of all crushed stone surfacing areas and detail drawings showing various components of the system, including subgrade and edging.
- C. Product Data: Manufacturer’s literature completely describing all components of crushed stone surfacing and edging including:
 - 1. Preparation instructions and recommendations.
 - 2. Installation methods and application procedures.
- D. Samples for Verification:
 - 1. Submit samples of each of the followings:
 - a. Three-pound sample of crushed bluestone surfacing material.
 - b. Edging material and stakes, not less than 12 inches long and 1 stake.

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 0140 00 “Quality Requirements”.
- B. Manufacturer’s: Company specializing in manufacturing Work of this Section with minimum 3 years documented experience.
- C. Single Source Responsibility: Obtain each crushed bluestone from single source.
- D. Mock-up: Provide a mock-up for evaluation of surface preparation, installation techniques and quality of application.
 - 1. Install 3-feet x 10-feet minimum of crushed bluestone surfacing, including edging. At location approved by Commissioner.
 - 2. Do not proceed with remaining work until installation of bluestone surfacing is approved by Commissioner.
 - 3. Approved mock-up may remain as part of completed Work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Bagged Materials: Accept delivery of materials only in unopened and undamaged containers bearing the brand name and manufacturer’s identification.

- C. Bulk Materials: Each load of crushed bluestone surfacing material arriving at the job site in bulk shall be accompanied by a delivery ticket containing the following minimum information.
 - 1. Quarry of origin.
 - 2. Amount, weight, and description of materials.
 - 3. Brand name and manufacturer’s identification

- D. Protect crushed bluestone surfacing and metal edging materials from contamination until ready for installation. Store under cover.

PART 2 - PRODUCTS

2.1 COARSE STONE

- A. Basis of Design Product: Subject to compliance with requirements, provide coarse stone- angular, crushed, bluestone, washed natural stone; free of shale, clay, friable materials and debris; graded in accordance with AASHTO T 27, within the following limits:

Sieve Size	Percent Passing
3/4-inch (20 mm)	[95] to [100]

- B. Supplied by Masonry Depot, 34 Evans Street, New Rochelle, NY, Tel: (914) 576-7777 or comparable product by one of the following:

- 1. Braen Supply, 400-402 Central Ave., Haledon, NJ, (973) 835-1419
- 2. Hardscrabble Supply, 110 Hardscrabble Road, North Salem, NY Tel: (914) 669-5150
- 3. Or approved equal.

2.2 STEEL EDGING

- A. Basis of Design Product: Subject to compliance with requirements, provide powder coated steel edging: 10’ long x 6” wide x ¼” thick with pre punched stake slots (3’-0” spacing) and stakes. Color: Black. Supplied by Colmet, 3333 Miller Park South, Garland, TX 75042, Tel: (800) 829-8225 Email: sales@colmet.com or comparable product by one of the following:

1.

- 1. Sure-Loc Edging, 310 E.6th St., Holland, MI 49423 Tel: (800) 787-3562
Email: info@surelocedging.com
- 2. Border Concept, 319 Enterprise Way, Pittston, PA 18640, Tel: (800) 845-3343
Email: sales@colmet.com
- 3. Or approved equal.

2.3 HERBICIDE

- A. Commercial chemical for weed control, registered by the EPA and not classified as restricted use, for location and condition of application. Application shall pose not short- or long-term health threats to installer or general public.

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS

- A. Refer to DDC General Conditions for executions requirements.

3.2 EXAMINATION

- A. Examine areas and conditions under which Work of this section will be performed. Notify Commissioner of any unsatisfactory preparation before proceeding.
- B. Correct conditions detrimental to timely and proper Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Lay out work prior to the commencement of installation.

3.3 PREPARATION

- A. Excavation: Excavate to depth required so edges of crushed bluestone surfacing will match adjacent grades and have a maximum cross-slope of 2 percent. Ensure edges and bottom of excavation are in a smooth and even line.
- B. Subgrade Preparation: Plow, harrow and mix entire surface of the in-place subgrade to a depth of at least 6". After the material has been thoroughly mixed, the subgrade shall be brought to line and grade and compacted to 95% of the maximum laboratory dry density as determined by the Standard Proctor test.
- C. Herbicide: Apply herbicide per manufacturer's written instructions. Limit the application to the areas to receive crushed bluestone surfacing.

3.4 INSTALLATION

- A. Steel Edging: Install edging flush with top of crushed bluestone surfacing. Provide sufficient stakes to secure edging in place during and after crushed bluestone surfacing installation.
- B. Subgrade: Proof-roll the subgrade with heavy pneumatic -tired equipment to locate unstable areas and to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Commissioner, and repave with compacted backfill or fill as directed.
 - 2. The surface of the completed subgrades shall be bladed smooth and uniform texture.
 - 3. The finished subgrade shall be uniform and free from deleterious debris such as organic materials, nails, stones, and loose soil.

3.5 INSTALLATION OF CRUSHED BLUESTONE SURFACING

- A. Spread crushed bluestone surfacing materials in 3-to-4-inch lifts. Spread the mix evenly and smoothly before compacting. Allow for 20-25% compaction.
- B. Wet the mix to ensure water has penetrated the full depth of the crushed bluestone surfacing material. And roll each lift to a uniform smooth surface with cross slope of 2% maximum. Compact lift to a minimum 95% density.
- C. Grade and smooth to required elevation; compact final lift with 1–3-ton drum roller or compactor.
- D. Minimum Compacted Thickness:
 - 1. Walkways and Container Areas: 6-inches
- E. Surface shall follow grades per plans. Allow for 1-2% cross pitch.

3.6 CLEAN-UP AND PROTECTION

- A. Thoroughly clean all areas where work has occurred. Remove from site excess material, debris and rubbish.
- B. Take all precautions necessary to protect completed work until Substantial Completion of project.

END OF SECTION 32 15 40

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SECTION 32 16 13

CURBS AND GUTTERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Construct concrete curbs as shown on the plans and in accordance with the NYCDOT Standard Specifications and as directed by the Commissioner.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials must conform to NYCDOT standard specifications, Sections 4.08, and 4.09, as applicable, latest revisions.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 CONSTRUCTION

- A. All concrete curbs and headers must be constructed at the locations and of the types shown on the plans and must conform to N.Y.C.D.O.T Standard Drawings and Specifications or as directed by the Commissioner.
- B. Roadway curbing must be 11" deep concrete. Concrete must be NYCDOT Class A-40 Type II A; cement must be type II Portland. An approved air-entraining agent must be added at the time concrete ingredients are mixed with water. Work materials must comply with Section 4.09 of the NYCDOT Bureau of Highway Operations "Standard Specifications" and with NYCDOT Standard Drawing No. H-1010.

3.3 TESTING

- A. Concrete materials and operations must be tested and inspected as the work progresses.
- B. The contractor must be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix

END OF SECTION 32 16 13



SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section includes:
 - 1. Chain link fencing.
 - 2. Gates.
 - 3. Hardware and accessories.
- B. Related Sections
 - 1. Section 03 30 00 "Cast-in-Place Concrete"

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data and installation instructions for metal fencing and gates.

1.4 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Provide chain link fences and gates as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Subject to compliance with requirements, provide products of one of the following:
 - 1. Anchor Fence, Inc.



- 2. Colorguard Corp.
- 3. United States Steel.
- 4. Or approved equal.

2.2 FENCING

- A. Fabric: No. 9 gauge (0.148") finished size steel wires two (2) inch mesh, with top selvages knuckled for fabric sixty (60) inches high and under, and both top and bottom selvages twisted and barbed for fabric over sixty (60) inches high.
 - 1. Fabric finish, galvanized, ASTM A392, Class II, with not less than 2.0 oz. zinc per square foot of surface.
- B. Framework: Galvanized steel, ASTM A120, with not less than 1.8 oz. zinc per square foot of surface.
- C. Hardware and Accessories: Galvanized, ASTM A152, with zinc weights per Table 1.

2.3 FRAMING AND ACCESSORIES

- A. End, Corner, Line and Pull Posts: 2.875" O.D. steel pipe weighing 5.79 lbs. per linear foot.
 - 1. Space line posts 10' - 0" o.c. maximum, unless otherwise noted on Drawings.
- B. Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

<u>Leaf Width</u>	<u>Gate Post</u>	<u>Lbs. per Linear Foot</u>
Up to 6'	2.875" OD pipe	5.79
Over 6' to 13'	4.000" OD pipe	9.11
Over 13' to 18'	6.625" OD pipe	18.97
Over 18'	8.625" OD pipe	28.55

- C. Top rail manufacturer's longest lengths, with expansion type couplings, approximately six (6) inches long, for each joint. Provide means for attaching top rail securely to each gate, corner, pull and end post.
 - 1. 1.66" OD pipe, 2.27 lbs. per square foot.
- D. Tension Wire: Seven (7) gauge, coated coil spring wire, metal and finish to match fabric located at bottom of fabric.
- E. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.



- F. Post Tops: Weathertight closure cap, one cap for each post. Furnish caps with openings to permit passage of top rail.
- G. Stretcher Bars: One piece lengths equal to full height of fabric, with minimum cross section of 3/16" x 3/4". Provide one stretcher bar for each gate and end post, and two (2) for each corner and pull post, except where fabric is integrally woven into post.
- H. Stretcher Bar Bands: Space not over fifteen (15) inches o.c. to secure stretcher bars to end, corner, pull, and gate posts.
- I. Gates: Fabricate swing gate perimeter frames of 1.90" OD pipe. Metal and finish to match framework. Provide horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware and accessories. Space so that frame members are not more than eight (8) feet apart.
 - 1. Assemble gate frames by welding or with special fittings and rivets, for rigid connections. Use same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges. Bars may also be used at top and bottom edges. Attach stretchers to gate frame at not more than fifteen (15) inches o.c. Attach hardware to provide security against removal or breakage. Install diagonal cross bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twists, if required.
- J. Gate Hardware: Furnish the following hardware and accessories for each gate.
 - 1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit one-hundred-eighty (180) degree gate opening. Provide 1-1/2 pair of hinges for each leaf over six (6) feet nominal height.
 - 2. Latch: Forked type or plunger bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
 - 3. Keeper: Provide keeper for vehicle gate, which automatically engages gate leaf and holds it in position until manually released.
 - 4. Double Gates: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors. Set in concrete, to engage center drip rod or plunger bar. Include locking device and padlock eyes as integral part of latch, using one padlock for locking both gate leaves.
 - 5. Sliding Gates: Provide manufacturer's standard heavy duty track, ball bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories as required.
- K. Wire Ties: For tying fabric to line posts, use wire ties spaced twelve (12) inches o.c. For tying fabric to rails and braces, use wire ties spaced twenty-four (24) inches o.c. For tying fabric to tension wire, use hog rings spaced twenty-four (24) inches o.c. Manufacturer's standard procedure will be accepted if of equal strength and durability.



- L. Concrete: Provide concrete for post footings consisting of Portland cement, ASTM C150, aggregates ASTM C33, and clean water. Mix materials to obtain concrete with a minimum twenty-eight (28) day compressive strength of two-thousand-five-hundred (2500) psi using at least four (4) sacks of cement per cubic yard, one (1) inch maximum size aggregate, maximum three (3) inch slump, and two (2) percent to four (4) percent entrained air.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Do not begin installation and erection before final grading is completed.
- B. Excavation: Drill holes for posts in firm, undisturbed or compacted soil.
 - 1. Excavate hole depths approximately three (3) inches lower than post bottom, with bottom of posts set not less than thirty-six (36) inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes three (3) inches above bottom of excavation.
- D. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
- E. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.
- F. Tension Wire: Install tension wires before stretching fabric and tie to each post with not less than six (6) gauge galvanized wire. Fasten fabric to tension wire using eleven (11) gauge galvanized steel hog rings spaced twenty-four (24) inches o.c.
- G. Fabric: Leave approximately two (2) inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- H. Stretcher Bars: Thread through or clamp to fabric four (4) inches o.c., and secure to posts with metal bands spaced fifteen (15) inches o.c.
- I. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.



- J. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two (2) full turns. Bend wire to minimize hazard to persons or clothing.
- K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric site. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION 32 31 13



**Department of
Design and
Construction**

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SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contractor Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Seeding of new lawns.
2. Sodding of new lawns.

B. Related Requirements:

1. Section 329113 “Soil Preparation” for soils and erosion control fabrics.
2. Section 329300 “Plants”

1.3 DEFINITIONS

- A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- B. Planting Soil: Existing, on-site amended soil or imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Sections 01 33 00 “Submittal Procedures”.
- B. Certification of grass seed.

1. Certification of each seed mixture.

C. Product certificates.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Installer Qualifications: Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

1. Landscape Industry Certified Technician - Exterior.
2. Landscape Industry Certified Lawncare Manager.
3. Landscape Industry Certified Lawncare Technician.

C. Pesticide Applicator: State licensed, commercial.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

PART 2 - PRODUCTS

2.1 GRASS SEED MIX

A. Basis of Design Product: Subject to compliance with requirements, provide Grass seed mix Survivor 50/50. Supplied by Agrium Direct Solutions, 165 Orville Drive, Bohemia, NY, 11716. Tele: 631-286-0598 or comparable product by one of the following:

1. Tuf Turf – Lesco Inc. 1385 East 36thSt. Cleveland OH, 44114 Phone: (800)347-4272
2. Survivor Tall Fescue Blend- Johnston Seed Company, 319 West Chestnut, Enid OK, 73707 Phone: (580) 249-4449.
3. Or approved equal.

2.2 SOD

A. Sod: Certified and approved, Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with TPI’s Specifications for Turfgrass Sod Materials” in the TPI "Guideline Specifications to Turfgrass Sodding," Turfgrass Producers International (TPI), 1855-A Hicks Road, Rolling Hills, IL 60008, (800) 405-8873.

1. Furnish viable sod of uniform density, color, and texture, strongly rooted and capable of vigorous growth and development when planted.
2. Thatch layer shall not exceed 1/8 inch (3 mm).

B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. Proportioned by weight as follows:

- a. 80 percent improved turf-type tall fescue blend (*Festuca arundinacea*). Provide minimum of two varieties of improved turf-type tall fescue formulated for the Northeastern United States region:
- b. 20 percent Kentucky bluegrass blend (*Poa pratensis*). Provide minimum of two varieties of improved bluegrass formulated for the Northeastern United States Region.

C. Basis of Design Product: Subject to compliance with requirements, turf-type tall fescue grown with a mineral based soil. Sod seed mix certificates, and sod samples must be approved by the Commissioner. Sod grown and supplied by: DeLalio Sod Farms LLC, 652 Deer Park Avenue, Dix Hills, NY 11746, 800-326-4763 Or comparable sod, grown by one of the following:

1. DeLea Sod Fam, 444 Elmwood Rd., East Northport, NY, 631.368.8022
2. Schmitt's Sod Farm, 26 PinelawnRd. Mellville, NY 11747, 631.351.8873
3. Or approved equal

2.3 FERTILIZERS/MYCORRHIZAL FUNGAL INOCULANTS

A. Basis of Design Product: Subject to compliance with requirements, provide granular fertilizer with mycorrhizal fungal inoculants for new lawns by Plant Health Care, Inc or comparable product by one of the following:

1. Roots PHC Plant Saver
2. BioPlex
3. Or approved equal.

B. Size: Granular material in 10Kg box.

2.4 MULCHING PELLETS

A. Basis of Design Product: Subject to compliance with requirements, provide mulching pellet with seed starter for new lawn applications by Profile Products LLC, or comparable product by one of the following:

1. Penmulch Seed Accelerator
2. Lesco Hydrocover
3. Or approved equal.

2.5 PESTICIDES

- A. General: Pesticides shall not be used. Contractor shall report any evidence of pest problems to the Commissioner.

2.6 HOSE COVERS

- A. Hose Covers for Pedestrian Walkways – At all locations where water hoses cross pedestrian paths provide hose covers that meet the following minimum requirements:
 - 1. Color shall be bright yellow or orange.
 - 2. Channel below shall be large enough to accommodate the diameter of the hose.
 - 3. Sides shall be beveled to provide a smooth “ramp”.
 - 4. Shall withstand light vehicular use.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 TURF AREA PREPARATION

- A. Prepare planting area for soil placement and mix planting soil. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- B. Before planting, obtain Commissioner acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.3 INSTALLATION OF SEEDING

- A. Prior to seeding spread fertilizer and mycorrhizal inoculants by broadcast spreader at rates recommended by manufacturer.
- B. Sow seeds with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
 - 1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- C. Sow seed at a total rate of 8 lb./1000 sq. ft.
- D. Rake seed lightly into top 1/8 – 1/4 inch of soil, roll lightly, and water with fine spray.

- E. Protect seeded areas with by spreading mulching pellets. Spread uniformly at a minimum rate recommended by the manufacturer.

3.4 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation. Maintenance shall continue for a minimum of 45 days after the area was seeded. Contractor shall furnish and set up hoses and sprinklers as required. All hoses that cross pedestrian paths shall be covered with hose covers.
- B. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

3.5 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Commissioner:
 - 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 3 by 3 inches.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.6 CLEANUP AND PROTECTION

- A. Maintain temporary construction fencing, barricades and warning signs as required to protect newly seeded areas from foot traffic and use. Maintain fencing and signs throughout and remove after turf grasses are established.

END OF SECTION 32 92 00

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SECTION 32 93 00

PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contractor Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

- A. Section Includes: All labor, equipment, appliances, materials, and services, required for the furnishing and installation of all Landscaping work complete in accordance with the specifications and applicable drawings. Work includes, but is not limited to the following:
1. Trees
 2. Perennials and Grasses
 3. Soil and Amendments
 4. Landscape Materials
 5. Maintenance

1.3 REFERENCES

- A. ANSI/ANLA Z60.1 - American Standard for Nursery Stock; 2004.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2001.

1.4 DEFINITIONS

- A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they are grown, with ball size indicated on drawings and as recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1.
- B. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized per ANSI Z60.1 for kind, type, and size of exterior plant required.
- C. Finish Grade: Elevation of finished surface of planting soil.
- D. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

- E. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments and perhaps fertilizer to produce a soil mixture best for plant growth.
- F. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- G. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling or mitigating a pest. Pesticides include insecticide, miticide, herbicide, fungicide, rodenticide, and molluscicide. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- I. Root Flare: (Also called ‘trunk flare.’) The area at the base of the plant’s stem or trunk where the stem or trunk broadens to form roots, the area of transition between the root system and the stem or trunk.

1.5 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Product Data: For each type of product indicated.
- C. Product Certificates: For soil amendments, fertilizers and mulch products, signed by product manufacturer, and complying with the following:
 - 1. Manufacturer’s certified analysis for standard products.
 - 2. Analysis of other materials by a recognized laboratory made per methods established by the Association of Official Analytical Chemists, where applicable.
- D. Qualification Data: For Landscape Installer.
- E. Material Test Reports: For imported topsoil.
- F. Planting Schedule: Indicating anticipated planting dates for plants.
- G. Maintenance Instructions: Recommended procedures to be established by Commissioner for maintenance of plants during a calendar year. Submit prior to the date of Substantial Completion and the start of the Guarantee Period.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

- B. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in typed of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 - 1. Report suitability of topsoil for plant growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory topsoil.
- D. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock".
 - 1. Selection of plants purchased under allowances will be made by Commissioner, who will tag plants at their place of growth before they are prepared for transplanting.
- E. Observation: Commissioner may observe trees and shrubs either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Commissioner retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. Notify Commissioner of sources of planting materials seven days in advance of delivery to site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery, except as approved by Commissioner. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during delivery. Do not drop plants during delivery.
- B. Handle planting stock by root ball.
- C. Deliver plants after preparations for planting have been completed and install immediately. If new or transplant planting is delayed more than six hours after delivery, set plants in shade, protect from weather and mechanical damage, and keep roots moist.
 - 1. Set balled stock on ground and cover ball with blended topsoil.
 - 2. Do not remove container-grown stock from containers before time of planting.
 - 3. Water root systems of new and transplanted plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.8 PROJECT CONDITIONS

- A. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion. Planting Restrictions: Plant during one of the following periods.

Plant	Spring Planting	Fall Planting
Deciduous Trees & Shrubs	March 1- May 15	October 15- Dec. 1
Evergreen Trees & Shrubs	April 1 – May 15	Sept. 1 – Oct. 15
Perennials & Grasses	April 15 – June 15	Sept. 1 – Oct. 15

- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.9 WARRANTY

- A. Special Warranty: Warrant the following plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Commissioner, or incidents that are beyond Contractor's control.
1. Warranty Period for Trees, Shrubs Perennials and Groundcover: Two year from date of Substantial Completion.
 2. Remove dead plants immediately. Replace immediately unless required to plant in the succeeding planting season.
 3. Replace exterior plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

1.10 START-UP

- A. Trees and Shrubs: Maintain until the of date substantial completion by pruning, cultivating, watering, weeding, fertilizing and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Utilize an IPM (Integrated Pest Management) Program as required to keep shrubs free of insects and disease.
- B. When Substantial Completion has not been reached before end of planting season, continue maintenance during next planting season, until substantial completion is determined.
- C. Perennials & Grasses: Maintain until the date of substantial completion by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings.
- D. Coordinate the installation of plant material with hand watering irrigation to minimize damage to plant material and ensure the plant material has 100% coverage.

PART 2 - PRODUCTS

2.1 TREE AND SHRUB MATERIAL

- A. General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

- B. Grade: Provide trees and shrubs of sizes and grades complying with ANSI Z60.1 for type of tree and shrubs required. Trees and Shrubs of a larger size may be used if acceptable to Commissioner, with a proportionate increase in size of roots or balls.
- C. Label at least one tree, shrub, perennial, groundcover and vine plant of each variety and caliper with securely attached, waterproof tag bearing legible designation of botanical and common name.

2.2 SHADE AND FLOWERING TREES

- A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required.
 - 1. Provide balled and burlapped or container-grown trees.
 - 2. Branching Height: one-half of tree height.
- B. Small Trees:
 - 1. Stem Form: Single or Multi-stem, clump, with three or more main stems.
 - 2. Provide balled and burlapped or container grown trees.

2.3 DECIDUOUS SHRUBS

- A. Provide balled and burlapped or container-grown shrubs.

2.4 CONIFEROUS EVERGREENS

- A. Form and Size: Specimen-quality, exceptionally heavy, tightly knit, symmetrically shaped coniferous evergreens and the following grade:
 - 1. Provide balled and burlapped or container grown trees.

2.5 PERENNIALS AND GRASSES

- A. Perennials and Grasses: Provide healthy, field-grown plants from a commercial nursery, of species and variety listed in the drawings.
 - 1. Provide container-grown perennials and grasses.

2.6 TOPSOIL

- A. Amended Planting Soil:
 - 1. Spread 1 ½” compost over area and incorporate into soil.
 - 2. Lime: as per test result recommendations.
 - 3. Weight of Sulfur or Iron Sulfate: As per test results recommendations.
 - 4. Weight of Agricultural Gypsum: As per test results recommendations.
 - 5. Weight of Super Phosphate: As per test results recommendations.
 - 6. Weight of Commercial Fertilizer: As per test results recommendations.
 - 7. Weight of Slow-Release Fertilizer: As per test results recommendations.



- B. Imported Planting – Soil: Manufactured soil consisting of manufacturer’s basic sandy loam per USDA textures, blended manufacturing facility with stabilized organic soil amendments, and other materials to produce viable planting soil.
1. Basis-of-Design Productions: Subject to compliance with requirements, provide standard blended Topsoil mix.
 2. Additional Properties of Manufacturer’s Basic Soil before amending: Soil reaction pH 6 to 7 and minimum 6 percent organic-matter content, friable and with sufficient structure to give good tilth and aeration.
 3. Unacceptable properties: Manufactured soil shall not contain the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chinks, cement plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants sod, clay lumps and pockets of coarse sand that exceed a combined maximum of 5 percent by dry weight of the manufactured soil.
 - c. Large Materials: Stones, clods, roots, clay lumps and pockets of coarse sand exceeding 1-½” inches in any dimension.
- C. Planting Soil Manufacturers -Suppliers
1. AG Choice, 714 Main St. Route 206, P.O. Box 1301, Andover, NJ 07821 Phone: (973)-786-5176. Fax (973)-786-6028, Or approved equal.
 2. We Care Denali, LLC, 400 Torne Valley Road, Bordentown, NJ Phone: (888)-325-1522
 3. Diamond Gro-New Enterprise Stone & Lime Co. Inc., 3912 Brumbaugh Rd., New Enterprise, PA 16664, Phone: (814)-766-2211

2.7 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
1. Class: T with a minimum of 99 percent passing through a No. 8 sieve and minimum of 75 percent passing through a No. 60 sieve.
 2. Class: O with a minimum of 95 percent passing through a No. 8 sieve and minimum of 55 percent passing through a No. 60 sieve.
 3. Form: Provide lime in form of pelleted calcite limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

- E. Sand: Clean washed, natural or manufactured, free of toxic materials and per ASTM C33.C33M.

2.8 ORGANIC SOIL AMENDMENTS

- A. Compost: Provide Humus Compost as supplied by AG Choice, 714 Main St. Route 206, P.O. Box 1301, Andover, NJ 07821 Phone: (973) -786-5176. Fax (973) 786-6028 Or approved equal.
- B. Compost Manufacturers - Suppliers
 1. AG Choice, 714 Main St. Route 206, P.O. Box 1301, Andover, NJ 07821 Phone: (973)-786-5176. Fax (973)-786-6028
 2. We Care Denali, LLC, 400 Torne Valley Road, Hillburn, NY, Phone: (888)-325-1522
 3. Diamond Gro -New Enterprise Stone & Lime Co. Inc., 3912 Brumbaugh Rd., New Enterprise, PA 1666, Phone: (814)- 766-2211

2.9 FERTILIZER/MYCORRHIZAL FUNGAL INOCULANTS

- A. Mycorrhizal Fungal Inoculants for newly planted shrubs and trees: PHC Tree Saver Packets manufactured by Plant Health Care, Inc. 285 Kappa Drive, Suite 100, Pittsburgh, PA 15238 USA (412)-826-5488, Or approved equal.
 1. Size: 85-gram bags
- B. Granular Fertilizer with Mycorrhizal Fungal Inoculants for newly planted perennials and groundcovers: PHC Flower Saver Plus Root Zone Treatment 3-4-3 manufactured by Plant Health Care, Inc. 285 Kappa Drive, Suite 100 Pittsburgh, PA 15238, USA (412) 826-5488, Or approved equal.
 1. Size: Granular materials in 11 lb. bag.
- C. Mycorrhizal Fungal Inoculants/ Granular Fertilizer Manufacturers -Suppliers
 1. Plant Health Care, Inc. 285 Kappa Drive, Suite 100, Pittsburgh, PA 15238 Phone:(412)-826-5488
 2. Roots PHC Plant Saver, Lebanon Seaboard Corp., 1600 E Cumberland St., Lebanon, PA 17402 Phone: (800) 233-0628
 3. Bio Plex, 114 Manheim St. Mt Joy, PA 17552, Phone: (800) 441-3572

2.10 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees, shrubs, perennials and groundcover areas with less than 4:1 slope consisting of the following:
 1. Type: Shredded hardwood or shredded bark.

2.11 HERBICIDE

- A. The following herbicide or approved equal shall be used:
1. Sygenta “Tenacity Herbicide” for use in established landscape beds to selectively kill weeds. Syngenta Regional Headquarters, PO Box 18300, Greensboro, NC 27409, Phone (336) 632-6000
 2. Scott’s “Roundup” for use in planting beds lawn areas to kill all weeds and grasses. Roundup, 14111 Scottslawn Rd., Marysville, OH 43041 Phone: (866)324-264
 3. Desperado, Selective Herbicide, Agribusiness, 3300 South Parker Road, Suite 500, Aurora CO 80014, Phone: (720) 306-6340

2.12 PESTICIDES

- A. General: Pesticides shall not be used. Contractor shall report any evident of pest problems to the Commissioner.

2.13 MISCELLANEOUS PRODUCTS

- A. Anti-desiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for shrubs. Deliver in original, sealed, and fully labeled containers and mix per manufacturer’s written instructions.
- B. Heavy Duty Rubber Hose: Flexible and kink resistant, extra heavy, crush resistant brass couplings.
1. Size: 5/8” diameter x 50’ lengths / 200’ minimum.
- C. Hose Caddy: Heavy duty frame and 8” wide track wheels 20” by 17 ¾” hose reel.
- D. Hose Covers: Heavy duty bright orange or yellow polymer with channel below large enough to accommodate the diameter of a garden hose with smooth beveled or ‘ramped’ sides that can withstand light vehicular use.
- E. Spray Nozzle: Solid brass with full size nozzle with adjustable spray.
- F. Tripod Sprinkler with Spray Head: Heavy duty 48” x 34” tripod sprinkler frame with 30” extension and spray head with part or full circle water distribution up to 80’ in diameter.
- G. Tree Watering Devices: Contractor is responsible for keeping newly planted trees and shrubs watered for the duration on the contract and maintenance period.
1. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period manufactured from UV-light stabilized nylon reinforced polyethylene sheets, PVC, or HDPE plastic.
- H. Tree / Large Shrub Stakes: Softwood lumber, pointed end.

- I. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

- A. Examine areas to receive soil and plants for compliance with requirements and conditions affecting installation and performance.
- B. Drainage: Notify Commissioner if subsoil conditions evidence unexpected water seepage or retention in shrub pits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, fixtures, furnishings and other facilities from damage caused by soil and planting operations.

3.4 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix un-amended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing subgrade is not graded proper elevations, frozen, muddy or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum of 12 inches (12"). Remove stones larger than 1-1/2" in any dimension, sticks, roots, rubbish and other extraneous matter and legally dispose of.
- C. Mixing: Spread new imported soils to required depths to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil is frozen, muddy or excessively wet.
 1. Amendments: Apply soil amendments, except compost and fertilizer, if required, evenly on surface, and thoroughly blend them not full depth of unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before compost.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8" in loose depth for material compacted by compaction equipment, and not more than 4" in loose depths for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended life of planting soil to 82 percent of maximum Standard Proctor density per ASTM D 698 and tested in-place.

- E. Finish Grading: Grade planting soil to a smooth, uniform plane with loose uniformly fine texture. Roll and rake, removed ridges, and fill depressions to meet finish grades.

3.5 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

- A. Application: Apply compost component of planting-soil mix 1-½ inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil is frozen, muddy or excessively wet.
- B. Finish Grading: Grade surface to a smooth, uniform plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. In planting beds where soils meet existing edges of pavements the soil shall be placed three inches below the top of the pavement to allow for installation of the mulch.

3.6 PROTECTION AND CLEANING

- A. Existing Tree Protection Zone: Identify the critical root protection zone of the existing tree and minimize disturbance soil work and erosion control blanket installation in that area.
- B. Protect areas with in-place planting soil from additional compaction, disturbance, and contamination. Fence off these areas with temporary construction fence. Prohibit the following practices within these areas except as required to perform planting and hand watering operations. Where feasible limit necessary activities to the extent possible and use track mats as walking path surfacing to protect prepared areas from foot traffic.
 - 1. Storage of construction materials, debris, or excavated materials.
 - 2. Parking of vehicles or equipment.
 - 3. Vehicular Traffic.
- C. Remove surplus soil and waste including excess subsoil, unsuitable materials, excess erosion control blanket materials, trash and debris and dispose of them legally.

3.7 PLANTING BED ESTABLISHMENT

- A. Lay out planting beds and areas with multiple planting. Stake/mark locations, outline areas, adjust locations when directed and obtain Commissioner's acceptance of layout before planting. Make minor adjustments as required.
- B. Before planting, restore planting bed areas if eroded and damaged or otherwise disturbed after finish grading.

3.8 EXCAVATION FOR TREES AND SHRUBS PLANTING

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Over-excavate the hole and then build up a mound to support the root ball. Scarify sides of planting pit smeared or smoothed during excavation.



2. Excavate at least two times as wide as the root ball or container diameter.
3. Obstructions: Notify Commissioner if unexpected rock, root or utility obstructions detrimental to plants are encountered in excavations.

B. Backfill Soil: Subsoil and topsoil removed from excavation may be used as backfill unless otherwise indicated. Excavated soil must be amended.

3.9 TREE AND SHRUB PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of rootball per ANSIZ60.1. If root flare is not visible, remove soil in a level manner from the rootball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that the rootball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set each plant plumb and in center of planting pit or trench with root flare 1” above finish grades.

1. Backfill: Planting soil- use amended on-site planting soil or new imported soil if required.
2. Balled and Burlapped Stock: After placing some backfill around the root ball to stabilize plant, careful cut and remove burlap, rope and entire wire backs. Remove pallet, if any, before setting. Do not use planting stock if rootball is cracked or broken before or during planting operations
3. Balled and Potted and Container-Grown Stock: Careful remove root ball from container without damaging root ball or plant. Cut any encircling roots and tease the edges of the rootball to blend with the interface between the rootball and the backfill soil.
4. Backfill around rootball in layers, tamping to settle soil, eliminate voids, and air pockets. When planting is approximately one-half filled water thoroughly and before placing the remainder of backfill. Repeat watering until no more water is absorbed.
5. Place Mycorrhizal Fungal Inoculants packets when pit is approximately one-half filled. Do not place packets on top of finished soil.
 - a. Quantity for Shrubs:

1) Up to 1 Gallon Container	1/3 rd packet
2) 1-2 Gallon Container	2/3 rd packet
3) 3-20 Gallon Container	1 packet
4) 8’ Ht. – 12’ Ht.	1 packet
5) 12’ Ht. – 16’ Ht.	2 packets
 - b. Quantity for Trees:

1) 18” – 24” Rootball	2 packets
2) 25” – 30” Rootball	3 packets
3) 31” – 44” Rootball	4 packets
6. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.10 TREE AND SHRUB PRUNING

A. Remove only the dead, dying or broken branches. Do not prune to shape.

- B. Prune, thin, and shape trees only as directed by the Commissioner.
- C. Prune, thin and shape trees and shrubs per professional horticultural and arbor culture practices. Unless otherwise indicated by Commissioner, do not cut tree leaders; remove only injured dying or dead branches from trees and shrubs; and prune to retain their natural character.

3.11 PERENNIAL AND GRASS PLANTS

- A. Set out and space perennials and grasses as indicated on the drawings.
- B. Verify the soil was properly amended and that all fertilizers, mycorrhizal inoculants and other amendments were added.
- C. Use existing amended planting soil for backfill.
- D. Dig holes large enough to allow spreading of roots, a minimum of 2 times the size of the rootball post, container or root mass.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.12 PLANTING AREA MULCHING

- A. All planting areas within the contract limit lines shall be mulched.
- B. Mulching: Apply 2-inch average thickness of shredded bark mulch extending to edge of planting bed as indicated or directed by Commissioner. Do not place mulch within 3 inches of trunks or stems.
- C. All new plants shall be mulched within 24 hours of being planted.

3.13 INSTALLING SLOW-RELEASE WATERING DEVICES

- A. Provide one slow-release watering device for each tree planted. Keep device filled on a daily basis. When irrigation system is operational remove slow-release watering devices.

3.14 PLANT MATERIAL IRRIGATION

- A. Contractor is responsible for keeping newly planted trees and shrubs watered for the duration of the contract period.
- B. All newly planted material shall be watered as required.
- C. Provide irrigation to all newly planted material by either portable sprinkler or hand watering.

- D. Portable hoses and sprinklers to be provided by the contractor and shall be set up at all planted areas. All hoses that crossroads or pedestrian walkways shall be covered with hose covers.
- E. All planted areas to be watered on a daily basis, or more as required.
- F. Prior to a weekend, holiday or other day when the contractor will not be on site, each planted area shall be fully watered saturated prior to the contractor leaving the site. The contractor shall coordinate with the Commissioner regarding having the facilities personnel perform watering on a day when the contractor is not on-site.

3.15 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch and erosion blanket materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas and soils free of pests and pathogens or disease. Use integrated pest management practices, when possible, to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage and biological control agents.
- D. Protect plants from damage during installation and maintenance periods. Treat, restore or replace damaged plantings.

3.16 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by landscape planting or maintenance work from paved areas. Clean wheels of equipment before leaving site to avoid tracking soil onto walks, or roads.
- B. Maintain temporary construction fencing, barricades and warning signs as required to protect newly planted areas from foot traffic and use. Maintain fencing and signs throughout and remove after plantings are established.

END OF SECTION 32 93 00

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SECTION 33 14 19

VALVES AND HYDRANTS FOR WATER UTILITY SERVICE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Furnish and deliver various fire hydrants, valves and fenders conforming with NYCDEP and NYCFD Standards.
 2. Install fire hydrants, valves and fenders at the locations shown on the plans in accordance with NYCDEP and NYCFD Standard Drawings and Specifications.
 3. Submit manufacturer's material/product specifications and recommendations for installation.

1.3 RELATED WORK

- A. Related work is described in the following sections of the specifications.
1. Section 31 22 00: Grading
 2. Section 31 41 16: Sheet Piling
 3. Section 31 23 33: Trenching and Backfilling
 4. Section 33 42 41: Gratings and Frames for Stormwater Drainage Inlets
 5. Section 33 42 11: Stormwater Gravity Piping

1.4 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

PART 2 - PRODUCTS

2.1 HYDRANTS

- A. All hydrants installed or replaced must conform to NYCDEP Standards and must be two-piece “breakaway” hydrants type S2-LP or D2-LP, as shown on the NYCDEP Bureau of Water Supply Standard Drawings Nos. 43250-Z or 43142-Z, respectively and as specified in the NYC Specifications No. 32H-1.

2.2 MATERIAL

- A. All material required to install fire hydrants including valves and valve boxes, connecting pipe and fenders must conform to NYCDEP Standards and Specifications.
- B. Wet and dry connections and corporation stops for connection to existing cast iron water mains must be in accordance with the “Rules and Regulations Governing and Restricting the Use and Supply of Water” as specified by the City of New York Department of Environmental Protection and with NYCDCP Water Supply Specifications, Form No. 6, Section 6.16.

2.3 FENDERS

- A. A minimum of two fenders must be installed for each hydrant. The fenders must conform to NYCDEP Standards.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

- A. Hydrants
 1. Hydrants must be installed in accordance with NYCDEP Standard Water Main Specifications, Form No. 8, and with AWWA Standard C600, entitled “Installation of Ductile Iron Water Mains and their Appurtenances”.
 2. All hydrants must stand plumb, each of their nozzles facing the curb at an angle of 45 degrees.
 3. Hydrants must be set to the established grade, with the centerline of the nozzle at an elevation above the grade as determined by the Commissioner.



4. Each hydrant must be connected to the main with a 6-inch diameter branch controlled by a 6-inch gate valve installed with valve box and appurtenances as shown on Bureau of Water Supply Standard Drawing No. 18581-B-Z.
 5. Drainage must be provided at the base of the hydrant by setting the hydrant upon a cast iron drain base and connecting it to the latter with 3/4-inch diameter brass pipe, tube log or soft-temper cooper tubing, and brass fittings, as shown on Bureau of Water Supply Standard Drawing No. 31050-Z, unless otherwise directed by the Commissioner.
 6. The drain pipe from the hydrant to the broken stone drain must be laid in the trench made for laying the hydrant branch and must be uniformly sloped to meet the top of the stone drain.
 7. Painting: The stand pipe above the ground line must be thoroughly cleaned, must be given one heavy coat of drying black enamel paint and the dome one heavy coat of bright aluminum paint.
 8. On the stand pipe, just below the nozzles, on the roadway face of the hydrant, must be stenciled, in white numerals five (5) inches high, the size of the main to which the hydrant is connected. The paint must be oil paint designed for exterior use.
- B. Fenders
1. Steel pipe hydrant fenders must be installed, encased in concrete in concrete collars, and painted in accordance with the applicable layout and method, details shown on Bureau of Water Supply Standard Drawing No. 45161-A-Z.
- C. Installation must be in accordance with requirements of the NYC Dept. of Environmental Protection and the manufacturer of the wet and dry connections to the existing water mains. Refer to Form Nos. 13 and 21 of the Standard Water Main Specifications.
- D. All connections must be tested in accordance with the requirements of the NYC Dept. of Environmental Protection.

END OF SECTION 33 14 19

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SECTION 33 31 13

SITE SANITARY SEWERAGE GRAVITY PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. The Contractor must furnish all labor, materials, supervision, equipment, tools, supplies and all other incidentals deemed necessary to install the sewer system and related site work. The work includes, but is not limited to the following:
 - a. Cast Iron Sewers
 - b. Excavation, Sheet piling and Bracing, and Backfill - (see Section 31 41 16)
 - c. Cutting into and Connecting Pipe into Existing Drainage Structures
 - d. Abandonment and removal of existing sewer structures (i.e., manholes, catch basins, etc.) and pipe
 - e. Providing Sewer House Connections
 - f. Inspection, sampling and testing of construction materials.

B. Related Sections include the following:

1. Section 31 41 16: Sheet Piling
2. Section 31 23 33: Trenching and Backfilling

1.3 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

- B. Unless otherwise specified or shown in the Contract Documents, all materials and workmanship must conform with all applicable provisions of the City of New York Department of Design and Construction, Division of Infrastructure Standard Sewer Specifications (SSS) latest edition, the New York City DEP General Specification 11-concrete (GS11) latest edition and the NYCDEP Sewer Design Standards (SDS) latest edition; and all revisions thereto, which are in effect are hereby made an integral part of the Technical Specifications of this Contract Document, except as modified hereinafter. All materials and workmanship must also conform with applicable requirements of NYSDOT Standard Sheets and Standard Specifications, latest edition.

- C. All materials and workmanship must also conform with relevant provisions of NYCDOT & NYCDEP stds.

1.4 AS-BUILT DRAWINGS, FINAL ACCEPTANCE AND GUARANTEE

- A. After the completion of the work, and as part of the close-out for the project, the Contractor must furnish without additional cost, and submit to the City of New York as-built drawings and final survey showing all work built as per the final plans or approved field changes. Such tracings must, in particular, indicate the final and actual sizes as well as locations and elevations thereof of any installed utilities, structures or related facilities.
- B. Final acceptance of the work must be obtained from the NYCDEP field inspector and the Commissioner, upon the satisfactory completion of all work.
- C. All work must be guaranteed for one year from the date of acceptance against all defects in materials, equipment and workmanship. Guarantee must also cover correcting damage to any part of the premises resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Commissioner.

1.5 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.6 MISCELLANEOUS

- A. All standards must be the latest edition and revision.
- B. The Contractor must notify NYCDOT, NYCDDC, NYSDOT and NYCDEP and secure and pay for all permits, licenses, and certificates relating to this work.

PART 2 - PRODUCTS

2.1 DEFINITIONS

- A. All definitions of materials must comply with SSS Section 2.01.

2.2 PIPE

- A. Extra Heavy Cast Iron Pipe (XHCI)

1. Pipe must be extra heavy cast iron pipe, conforming to ASTM A 74. Pipe must have an outer coating of coal tar. Cast iron fittings must have a pressure classification of at least equal to that of the pipe with which they are used. Fittings, joints, and accessories must comply with the requirement of ASTM A 74. All cast iron pipe must conform to Section 2.06 of the Standard Sewer Specifications, DDC, except for pipe lining requirement.

2. All pipe must have markings indicating weight, class, manufacturer's name, year of manufacture, and the letters CI. Markings must be cast or painted conspicuously in white paint that will withstand field handling on the outside of each pipe length, fitting, and special casting after the exterior shop coat has hardened.

2.3 CONCRETE

- A. Concrete for pipe cradles, encasements and drainage and structures must be homogeneous Class 40 mix with Grade 60 reinforcing steel and must comply with the requirements of GS11 as modified by SSS Section 2.08, except that the Contractor (not DEP) must retain concrete testing lab services.

2.4 MORTAR, PORTLAND CEMENT

- A. Portland cement mortar must be of the type specified in SSS Section 2.10.

2.5 GROUT, PORTLAND CEMENT

- A. Grout must be Type 2, unless otherwise specified, and must comply with SSS Section 2.11.

2.6 INSPECTION OF MATERIALS, SAMPLING AND METHODS OF TESTS

- A. All materials to be used under this Section must conform to requirements of the New York City DEP Standard Sewer Specification (SSS). Inspection and approval must be based on the standards and procedures set forth in SSS Section 3.01.
- B. The Contractor must furnish and deliver as directed, without charge, samples, affidavits and other information required of the materials intended to be used, as specified in SSS Section 3.02.
- C. Methods of test must comply with the requirements of SSS Section 3.03.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL CONSTRUCTION PROVISIONS

- A. Prosecution of work and staging operations must be shown on the plans and comply with SSS Section 4.01.2.
- B. Trench excavation must comply with Section 4.02.
- C. Earth excavation must comply with SSS Section 4.03.
- D. Excavation of boulders in trenches must comply with SSS Section 4.03A.
- E. Sheeting and bracing must comply with SSS Section 4.05 and with Section 31 41 16 of these Specifications.
- F. Backfilling must comply with SSS Section 4.06 and with Section 31 23 33 of these Specifications for Select Granular Fill and Clean Backfill requirements.
- G. Proctor analyses of soils and soil density testing must be performed as directed at trench subgrade, at various lifts of compacted trench backfill and at pavement subgrade, in accord with SSS Sections 4.06.3 and 4.06.4.
- H. All sewers and appurtenances to be constructed under this Contract must be tested for leakage. Methods of testing for leakage must comply with the requirements of SSS Section 4.08.
- I. Prior to the final inspection of the work completed under this Contract, the Contractor must make a closed-circuit television inspection and video tape recording of all sewers constructed and prepare a report detailing the results of the inspection, all in accord with SSS Section 5.25.
- J. Cleaning up must comply with SSS Section 4.09.
- K. Immediately after trench backfill and soil compaction operations, the Contractor must temporarily restore all sidewalk and street surfaces affected with a 4" thick asphaltic concrete binder base paving course on a 6" broken stone sub-base, as per SSS Section 4.09. Materials must comply with NYCDOT Standards and Specifications.
- L. The Contractor must maintain safe access to the various building sites within the project area.
- M. The Contractor must furnish, erect, and maintain at closures, intersections and at all other locations where necessary, all necessary standard or approved barricades, suitable and sufficient lights, approved reflectors, danger signals, warnings and closure signs, directional detour signs, for proper control of traffic and safety of the public. All barricades, danger signals, warning signs and obstructions must be illuminated at night and all lights must be kept burning from sunset until sunrise.
- N. Temporary fence must be installed around the immediate sewer construction work area in accord with SSS Section 5.30.
- O. The Contractor is to provide for maintenance of traffic in accordance with SSS Section 1.06.29.

- P. The Contractor must take necessary precautions to protect site conditions to remain. Should damage be incurred, the Contractor must restore the site condition to its original condition at own expense.
- Q. The Commissioner reserves the right to reject material or work which does not conform to the Contract Documents. Rejected work must be removed or corrected at the earliest possible time.

3.3 EXECUTION

- A. Cast iron pipe for sewers
 - 1. Cast iron pipe sewers and joints must comply with SSS Section 21.06, unless otherwise noted. Pipe must be placed in crushed stone bedding a minimum of 6 inches thick wrapped in filter fabric as shown on SDS Dwg. No. 62. Crushed stone must comply with SSS Section 4.12 and Section 31 52 00 of these Specifications.
- B. Sewer building connections
 - 1. Sewer building house connections must be constructed of the sizes and to the lines and grades shown on the Contract Drawings or as ordered in conformance with the provisions of the SSS Sections 5.13, 5.11 and 5.12, and with SDS Drawing Nos. 62, 63, 64 and 65.

END OF SECTION 33 31 13

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SECTION 33 42 11

STORMWATER GRAVITY PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. The Contractor must furnish all labor, materials, supervision, equipment, tools, supplies and all other incidentals deemed necessary to install the sewer system and related site work. The work includes, but is not limited to the following:
 - a. HDPE, ESVP DIP and XHCI Sewers
 - b. Excavation, Sheeting and Bracing, and Backfill - (see Section 31 23 16.20)
 - c. Concrete Cradles - (see Section 31 23 16.20)
 - d. Concrete Manholes and Catch Basins (NYC Standard) - (see Section 33 42 30)
 - e. Ductile Iron Pipe for Catch Basin Connections (NYC Standard)
 - f. Cutting into and Connecting Pipe into Existing Drainage Structures
 - g. Abandonment and removal of existing sewer structures (i.e., manholes, catch basins, etc.) and pipe
 - h. Providing Sewer House Connections
 - i. Inspection, sampling and testing of construction materials.

B. Related Sections include the following:

1. Section 31 41 16: Sheet Piling
2. Section 31 23 33: Trenching and Backfilling
3. Section 33 42 30: Stormwater Area Drains and Inlets

1.3 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

- B. Unless otherwise specified or shown in the Contract Documents, all materials and workmanship must conform with all applicable provisions of the City of New York Department of Design and Construction, Division of Infrastructure Standard Sewer Specifications (SSS) latest edition, the New York City DEP General Specification 11-concrete (GS11) latest edition and the NYCDEP Sewer Design Standards (SDS) latest edition; and all revisions thereto, which are in effect are hereby made an integral part of the Technical Specifications of this Contract Document, except

as modified hereinafter. All materials and workmanship must also conform with applicable requirements of NYSDOT Standard Sheets and Standard Specifications, latest edition.

- C. All materials and workmanship must also conform with relevant provisions of NYCDOT & NYCDEP stds.

1.4 AS-BUILT DRAWINGS, FINAL ACCEPTANCE AND GUARANTEE

- A. After the completion of the work, and as part of the close-out for the project, the Contractor must furnish without additional cost, and submit to the City of New York as-built drawings and final survey showing all work built as per the final plans or approved field changes. Such tracings must, in particular, indicate the final and actual sizes as well as locations and elevations thereof of any installed utilities, structures or related facilities.
- B. Final acceptance of the work must be obtained from the NYCDEP field inspector and the Commissioner, upon the satisfactory completion of all work.
- C. All work must be guaranteed for one year from the date of acceptance against all defects in materials, equipment and workmanship. Guarantee must also cover correcting damage to any part of the premises resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Commissioner.

1.5 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.6 MISCELLANEOUS

- A. All standards must be the latest edition and revision.
- B. The Contractor must notify NYCDOT, NYCDDC, NYSDOT and NYCDEP and secure and pay for all permits, licenses, and certificates relating to this work.
- C. In the case of a conflict between the City requirements and this Specification, the City specification must govern unless directed otherwise by the Commissioner.
- D. The Contractor must coordinate the work and cooperate with other trades working in the same general area.

PART 2 - PRODUCTS

2.1 DEFINITIONS

- A. All definitions of materials must comply with SSS Section 2.01.

2.2 PIPE

- A. Vitrified clay pipe must be extra-strength and must comply with SSS Section 2.02. Precast reinforced concrete pipe must comply with SSS Section 2.05. Ductile iron pipe must comply with Section 2.06. Cast iron soil pipe must conform with SSS Section 2.04. Joint materials for pipe must comply with SSS Section 2.07.
- B. High-Density Polyethylene Pipe (HDPE):
1. High Density Polyethylene pipe and fittings must have smoothed interior and corrugated annular exterior. The material of construction must consist of closed foam cell having a minimum compressive strength of 20 psi, which will provide high stress resistance to cracks.
 2. The bell-and-spigot HDPE piping network must be joined using watertight connections in accordance with the requirements of ASTM D3212. Elastomeric seals (Gaskets) made of polyisoprene and meeting the requirements of ASTM F477 must show no visible leaks when tested under a 10 ft hydrostatic water test or an ex-filtration rate that is consistent during a water test with a leakage rate that conforms with the design. Attach form CDD-1 for the acceptable ex-filtration rate.
 3. To prevent crumbling and provide better joint performance of the HDPE pipe, the bell and spigot ends must be reinforced, including a bell tolerance device. The bell tolerance device must be installed by the pipe manufacturer.
- C. Ductile Iron Pipe (D.I.P.)
1. Pipe must be centrifugally cast ductile iron pipe, 60-42-10 grade, conforming to ASTM A21.51, Class 56. Pipe must have an outer coating of coal tar. Ductile iron fittings must have a pressure classification of at least equal to that of the pipe with which they are used. Fittings, joints, and accessories must comply with the requirement of ANSI A21.10 and ANSI A21.11. All ductile iron pipe must conform to Section 2.06 of the Standard Sewer Specifications, DDC, except for pipe lining requirement.
 2. Fittings must be Thickness Class 56 for all sizes of pipe.
 3. All pipe must have markings indicating weight, class, manufacturer's name, year of manufacture, and the letters DI. Markings must be cast or painted conspicuously in white paint that will withstand field handling on the outside of each pipe length, fitting, and special casting after the exterior shop coat has hardened.
- D. Polyvinyl Chloride Pipe (P.V.C.)
1. Perforated pipe must be polyvinyl chloride pipe, conforming to ASTM D 2729 and ASTM D1784, cell class 12454 or 12364.. PVC pipe must be installed with the perforations facing down, 120 degrees apart.

2.3 CONCRETE

- A. Concrete for pipe cradles, encasements and drainage and structures must be homogeneous Class 40 mix with Grade 60 reinforcing steel and must comply with the requirements of GS11 as modified by SSS Section 2.08, except that the Contractor (not DEP) must retain concrete testing lab services.

2.4 BRICK

- A. Brick used in the construction of sewer structures must comply with SSS Section 2.09.

2.5 MORTAR, PORTLAND CEMENT

- A. Portland cement mortar must be of the type specified in SSS Section 2.10.

2.6 GROUT, PORTLAND CEMENT

- A. Grout must be Type 2, unless otherwise specified, and must comply with SSS Section 2.11.

2.7 IRON CASTINGS, GRAY AND MALLEABLE

- A. Iron casting, gray and malleable, must comply with SSS Section 2.13 and with Section 33 42 41 of these Specifications.

2.8 INSPECTION OF MATERIALS, SAMPLING AND METHODS OF TESTS

- A. All materials to be used under this Section must conform to requirements of the New York City DEP Standard Sewer Specification (SSS). Inspection and approval must be based on the standards and procedures set forth in SSS Section 3.01.
- B. The Contractor must furnish and deliver as directed, without charge, samples, affidavits and other information required of the materials intended to be used, as specified in SSS Section 3.02.
- C. Methods of test must comply with the requirements of SSS Section 3.03.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL CONSTRUCTION PROVISIONS

- A. Prosecution of work and staging operations must be shown on the plans and comply with SSS Section 4.01.2.
- B. Trench excavation must comply with Section 4.02.
- C. Earth excavation must comply with SSS Section 4.03.
- D. Excavation of boulders in trenches must comply with SSS Section 4.03A.
- E. Sheeting and bracing must comply with SSS Section 4.05 and with Section 31 53 14 of these Specifications.
- F. Backfilling must comply with SSS Section 4.06 and with Section 31 23 16.20 of these Specifications for Select Granular Fill and Clean Backfill requirements.
- G. Proctor analyses of soils and soil density testing must be performed as directed at trench subgrade, at various lifts of compacted trench backfill and at pavement subgrade, in accord with SSS Sections 4.06.3 and 4.06.4.
- H. All sewers and appurtenances to be constructed under this Contract must be tested for leakage. Methods of testing for leakage must comply with the requirements of SSS Section 4.08.
- I. Prior to the final inspection of the work completed under this Contract, the Contractor must make a closed-circuit television inspection and video tape recording of all sewers constructed and prepare a report detailing the results of the inspection, all in accord with SSS Section 5.25.
- J. Cleaning up must comply with SSS Section 4.09.
- K. Immediately after trench backfill and soil compaction operations, the Contractor must temporarily restore all sidewalk and street surfaces affected with a 4" thick asphaltic concrete binder base paving course on a 6" broken stone sub-base, as per SSS Section 4.09. Materials must comply with NYCDOT Standards and Specifications.
- L. The Contractor must maintain safe access to the various building sites within the project area.
- M. The Contractor must furnish, erect, and maintain at closures, intersections and at all other locations where necessary, all necessary standard or approved barricades, suitable and sufficient lights, approved reflectors, danger signals, warnings and closure signs, directional detour signs, for proper control of traffic and safety of the public. All barricades, danger signals, warning signs and obstructions must be illuminated at night and all lights must be kept burning from sunset until sunrise.
- N. Temporary fence must be installed around the immediate sewer construction work area in accord with SSS Section 5.30.
- O. The Contractor is to provide for maintenance of traffic in accordance with SSS Section 1.06.29.

- P. The Contractor must take necessary precautions to protect site conditions to remain. Should damage be incurred, the Contractor must restore the site condition to its original condition at own expense.
- Q. The Commissioner reserves the right to reject material or work which does not conform to the Contract Documents. Rejected work must be removed or corrected at the earliest possible time.

3.3 EXECUTION

- A. **Vitrified clay pipe sewers**
 - 1. Vitrified clay pipe must be extra strength per SSS Section 21.02. Pipe construction must be as shown on SDS Dwg. No. 1 with Class 40 concrete pipe cradle, except that pipe must be fully encased in concrete where pipe cover is less than 4 feet. Joints must be Type 6-Elastomeric per SSS Section 2.07.3 (F).
- B. **Reinforced concrete pipe sewers**
 - 1. Reinforced concrete pipe sewers and joints must comply with SSS Section 21.05. Pipe construction must be as shown on SDS Dwg. No. 3 with Class 40 concrete cradle, except that pipe must be full encased in concrete where pipe cover is less than 4 feet.
- C. **Ductile iron pipe for sewers and catch basin connections**
 - 1. Ductile iron pipe sewers and joints must comply with SSS Section 21.06, and be Class 56 unless otherwise noted. All catch basin connection pipe must be cement-lined 12" diameter Class 56 ductile iron with push-on joints per SSS Section 5.10. Pipe must be placed in crushed stone bedding a minimum of 6 inches thick wrapped in filter fabric as shown on SDS Dwg. No. 62. Crushed stone must comply with SSS Section 4.12 and Section 31 52 00 of these Specifications.
- D. **Sewer building connections**
 - 1. Sewer building house connections must be constructed of the sizes and to the lines and grades shown on the Contract Drawings or as ordered in conformance with the provisions of the SSS Sections 5.13, 5.11 and 5.12, and with SDS Drawing Nos. 62, 63, 64 and 65.
- E. **Manholes**
 - 1. Manholes must be constructed as shown on the drawings. Manholes must be constructed of poured-in-place reinforced concrete or approved precast concrete units in conformance with the requirements of Sections 5.07 and 5.08 and the applicable Sewer Design Standards. The location of manholes shown on the Drawings is subject to change to suit field conditions. Such changes, if any, will be ordered by the Commissioner as the Work progresses, and must be done at no additional cost. Refer to Section 334500 of these Specifications.

- F. Catch basins (New York City standard)
 - 1. New York City Standard Type 1, Type 2 and Type 3 catch basins must be constructed of poured-in-place concrete or approved precast concrete units. Materials and construction methods must comply with the requirement of SSS Section 5.09 and applicable Sewer Design Standards. Refer to Section 334230 of these Specifications.

- G. Area drains
 - 1. Area drains are to be used for on-site areas only. See plans for area drain dimensional requirements.

- H. Abandonment and removal of existing sewer structures and pipe
 - 1. The extent of existing sewer structures to be abandoned or removed must be as shown on the Contract Drawings. Structures to be abandoned must be removed to a depth of 2.0 feet below proposed grade. The existing structure must be bulkhead as directed by the Commissioner, and hydraulically filled with clean sand. Salvageable material (castings, frames and grates, etc.) must be returned to a New York City sewer department yard in accordance with SSS Section 1.06.27 “salvageable materials”. The limits of existing sewer pipe to be abandoned or removed must be as shown on the Contract Drawings or as directed by the Commissioner. Sewer Pipe to be abandoned must be plugged with concrete for a length of 12 inches at the end of the pipe that enters the new or existing sewer structure to remain.

END OF SECTION 33 42 11

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SECTION 33 42 31

STORMWATER AREA DRAINS AND INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
1. Construction of area drains, catch basins and manholes per NYCDEP Sewer Design Standard Drawings (SDS) and NYCDEP Standard Sewer Specifications (SSS) and as shown on the plans or directed by the Commissioner. All materials and workmanship must also conform with applicable requirements of NYSDOT Standard Sheets and Standard Specifications, latest edition.
 2. Furnish and install frames, grates and covers for sewer structures in accordance with SSS Section 2.13 and with Section 33 42 41 of these Specifications.

1.3 SUBMITTALS

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.
- B. Submit concrete design mix report and material certificates for concrete and mortar mixes.
- C. Submit product data for admixtures, curing compounds and reinforcement.
- D. Submit material certificates and catalog cuts for frames, grates and covers.
- E. Should the Contractor propose, as an alternate, the use of precast structures submit shop drawings and material certificates for such structures.

1.4 RELATED WORK

- A. Related work is described in the following sections of the specifications.
1. Section 31 22 00: Grading
 2. Section 31 41 16: Sheet Piling
 3. Section 31 23 33: Trenching and Backfilling
 4. Section 33 42 41: Gratings and Frames for Stormwater Drainage Inlets
 5. Section 33 42 11: Stormwater Gravity Piping

1.5 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete must comply with NYCDEP Specification SSS Section 2.08 for Class 40.
- B. Steel reinforcement must comply with the requirements of ASTM A615, Grade 60, Billet Steel Bars for Concrete reinforcement.
- C. Gray iron castings must be class No. 30, ASTM A48, with a minimum tensile strength of 30,000 pounds per square inch. The flexural test described in ASTM A44 must be the primary test used in testing the iron. Comply with SSS Section 2.13 and Section 33 42 41 of these Specifications.
- D. For manholes and for all catch basins/inlets and area drains, bedding (where ordered by Commissioner) must be broken stone conforming with NYCDEP Standard Specifications Sections 4.12 & 5.18. Backfill material must comply with SSS Sections 5.14 and 4.06, as specified in Section 31 23 16.20 of these Specifications.
- E. Hydrodynamic separators to be precast concrete units with all required internal appurtenances for meeting the required water quality volume for stormwater treatment. Hydrodynamic separators to be:
 - 1. Hydro International, First Defense Optimum vortex separator,
 - 2. Advanced Drainage Systems, Inc; Barracuda MAX Hydrodynamic Separator
 - 3. CONTECH Stormwater Solutions, Continuous Deflective Separator (CDS)
 - 4. Or approved equal.
 - 5. Hydrodynamic separators to be installed per manufacturers requirements.
- F. Trench drain to be by:
 - 1. NDS, Pro Series
 - 2. ACO Polymer Products, Klassikdrain
 - 3. ABT Inc, Polydrain
 - 4. Or approved equal.
 - 5. Drainage structures to be installed per manufacturers requirements.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

3.2 CONSTRUCTION

- A. The drainage structure installation or construction includes excavation, construction, backfilling and restoration of the pavement or ground, as shown on the plans, in accordance with NYCDEP Standard Sewer Specifications and as directed by the Commissioner.
- B. For manholes and for all catch basins/inlets, bedding (where ordered by Commissioner) must be broken stone (DEP Specifications Sections 4.12 & 5.18). Manholes and catch basins must conform with section 5.07, 5.08 and 5.09.
- C. All frames and grates must be adjusted to final grade.
- D. Applicable SDS drawings include Nos. 11; 13; 24; 28A, B, C; 29A, B, C; 30A, B, C, D; 31A, B, C; 32; 48; 49; 53; 54.

3.3 TESTING

- A. Concrete materials and operations must be tested and inspected as the work progresses in accord with the provisions of NYCDEP General Specification 11 (GS 11) - Chapter 16, as modified by SSS Section 2.08.
- B. The contractor must be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.
- C. The testing lab representative must check the concrete slump, air content, concrete temperature and the concrete unit weight and yield for each set of cylinders and for each truck delivery. The Contractor must provide adequate facilities (heated, insulated curing box, etc.) on the project site for the safe storage and proper curing of concrete test cylinders for the first 24-hours, prior to transport to the testing lab.

END OF SECTION 33 42 31

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SECTION 33 42 41

GRATINGS AND FRAMES FOR STORMWATER DRAINAGE INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. Section Includes:
 - 1. Gray iron castings such as frames and grates, manhole frames and covers, etc. for sewer drainage structures, water main valve manholes or for street lighting pull boxes, and must conform with NYCDEP (or NYCDOT or NYSDOT where applicable) Standard Specifications, or as specified on the drawings.

1.3 STORAGE

- A. All castings must be stored as specified in the applicable NYC Standards and NYSDOT Specifications.

1.4 RELATED WORK

- A. Related work is described in the following sections of the specifications
 - 1. Section 33 42 31: Stormwater Area Drains and Inlets

1.5 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.6 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Gray cast iron castings must be class No. 30, ASTM A48, with a minimum tensile strength of 30,000 pounds per square inch. The flexural test described in ASTM A44 must be the primary test used in testing the iron.
- B. All castings for inlets, catch basins, manholes, chambers, water main valve manholes, etc. must be as per NYCDEP Standards, or as specified on the drawings.
- C. The weight of each casting must be conspicuously painted thereon in white oil paint.
- D. The iron must be such as will make castings which are of close and even grain and easily machined.
- E. Castings must be true to pattern, free from cracks, gas bores, flaws and excessive shrinkage. Surface of castings must be free from burnt-on sand and must be reasonably smooth after cleaning. Runners, risers, fins and other cast-on pieces must be removed. Plugging and fillings will not be allowed.
- F. When “machining” is specified on the drawings, it must mean the use of a machine or machines having cutting tool or tools to produce such surfaces and dimensions to a true and even surface.
- G. The underside of the seating rim of manhole covers must be machined. The upper side of the cover seating rim of manhole heads must also be machined.
- H. Chemical and Physical requirements of gray iron must comply with requirements of ASTM A48.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DDC General Conditions for execution requirements.

END OF SECTION 33 42 41

FMS ID: **SANDBOMB**



**Department of
Design and
Construction**

**THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS**

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TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

NYPD Bomb Squad Building

**LOCATION: 100A Rodman's Neck Path, Pelham Bay Park
BOROUGH: Bronx, NY 10464
CITY OF NEW YORK**

Contractor _____

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper _____

Dated _____, 20____

