CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS
VOLUME 1 – BID BOOKLET

MULTI CONTRACT WICKS 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

Multi Contract

Multi CONTRACT: The requirements of the Wicks Law for separate prime contractors apply to this Project. The Project consists of a multi contract.

Please see the Addendum to General Conditions in Volume 3 for which separate prime contracts are part of this Project. All of the separate prime contracts are solicited in PASSPort as separate RFx, but all contain the same Project ID in the title.

PROJECT LABOR AGREEMENT: This contract is NOT subject to a Project Labor Agreement ("PLA").

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 Pages1-2) 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 is 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.

BID SUBMISSION FORM

Bidder Name: Interphase Electric Corp
Procurement Title: 85024B0006-PV669-NPC Nuyorican Poets Cafe Renovation Rebid - Contract 4 Electrical

RFx Name: 85024B0006-PV669-NPC Nuyorican Poets Cafe Renovation Rebid - Contract 4 Electrical

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): $ 3,081,416.00
+ All Allowances (Allowances Item Grid): $ 5,000.00

= Total Bid Price: (a/k/a Total Amount): $ 3,086,416.00

Bidder Signature

EIN (if applicable): 11-2475482
(EIN must match the EIN of the entity that submitted bid information in PASSPort)

Bidder Name: Interphase Electric Corp

By: Eric Vilcek - Vice President
(Name of Partner of Corporate Officer)

Signature:
(Signature of Partner of Corporate Officer)

Bid Price

item_code	item_label	itype_label	Bid Price
1	Lump Sum Bid Amount	Required Item	3081416.000 00000

Allowances

item_code	item_label	itype_label	Additions	YOU MUST ENTER 1 IN THE BOXES BELOW	Additions _1
i1_2	ALLOWANCE for Incidental Asbestos Abatement (Section 260013 of the Specifications)	Additional Fees	5000.000000 0000	5000.000000 00	5000.000000 00

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, Interphase Electric Corp.
79 Rocklyn Ave., Lynbrook, NY 11563

hereinafter referred to as the "Principal", and RLI Insurance Company
9025 North Lindbergh Drive, Peoria, IL 61615

hereinafter referred to as the "Surety" 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

Ten Percent of Amount Bid

($10% of Bid Amount), 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 submit (or has submitted) to the City the accompanying proposal, hereby made a part hereof, to enter into a contract in writing for

Nuyorican Poets Cafe Renovation Rebid Contract #4 - Electrical Work

Contract PV669-NPC

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall not withdraw said Proposal without the consent of the City for a period of forty-five (45) days after the opening of bids and in the event of acceptance of the Principal's Proposal by the City, if the Principal shall:

(a) Within ten (10) days after notification by the City, execute in quadruplicate and deliver to the City all the executed counterparts of the Contract in the form set forth in the Contract Documents, in accordance with the proposal as accepted, and

(b) Furnish a performance bond and separate payment bond, as may be required by the City, for the faithful performance and proper fulfillment of such Contract, which bonds shall be satisfactory in all respects to the City and shall be executed by good and sufficient sureties, and

(c) In all respects perform the agreement created by the acceptance of said Proposal as provided in the Information for Bidders, bound herewith and made a part hereof, or if the City shall reject the aforesaid Proposal, then this obligation shall be null and void; otherwise to remain in full force and effect.

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to the Principal the Surety hereunder agrees subject only to the payment by the Principal of the premium therefore, if requested by the City, to write the aforementioned performance and payment bonds in the form set forth in the Contract Documents.

It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

There shall be no liability under this bond if, in the event of the acceptance of the Principal's Proposal by the City, either a performance bond or payment bond, or both, shall not be required by the City on or before the 30th day after the date on which the City signs the Contract.

The surety, for the value received, hereby stipulates and agrees that the obligations of the Surety and its bond shall in no way be impaired or affected by any postponements of the date upon which the City will receive or open bids, or by any extensions of the time within which the City may accept the Principal's Proposal, or by any waiver by the City of any of the requirements of the Information for Bidders, and the Surety hereby waives notice of any such postponements, extensions, or waivers.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the 5th day of October, 2023.

(Seal)

Interphase Electric Corp. (L.S.)
Principal

By: _____

(Seal)

RLI Insurance Company
Surety

By: _____
David A. Goldstein, Attorney-In-Fact

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Nassau ss:
On this 16th day of October, 2023, before me personally came
Eric Vitale to me known, who, being by me duly sworn, did
depose and say that he/she/they resides at 16 Meiton Drive West
Rockville Centre, NY 11570
that he/she/they is the Vice President of
Interphase Electric Corp
the corporation described in and which executed the foregoing instrument; that he/she/they 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/she/they signed his name thereto by like order.

Nicole M. Nestro

Notary Public

NICOLE M. NESTRO
STATE OF NEW YORK
NOTARY PUBLIC
Qualified in Nassau County
01NE6187995
MY COMMISSION EXPIRES 06/02/20 24

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/she/they acknowledged to me that he/she/they executed the same as and for the act and deed of said firm.

_____

Notary Public

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/she/they executed the same.

_____

Notary Public

AFFIX ACKNOWLEDGMENTS AND JUSTIFICATION OF SURETIES

ACKNOWLEDGMENT OF SURETY

State of New York

County of Suffolk ss:

On this 5th day of October, 2023 before me personally appeared

David A. Goldstein to me known, who, being by me duly sworn, did depose and say
that he resides at Merrick, New York
that he is the Attorney-in-Fact of RLI Insurance Company

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 hereto by like order.

Jennifer Spadaro

JENNIFER SPADARO
Notary Public, State of New York
Reg. No. 01SP5017514
Qualified in Suffolk County
Commission Expires September 7, 2025

POWER OF ATTORNEY

RLI Insurance Company
Contractors Bonding and Insurance Company

9025 N. Lindbergh Dr. Peoria, IL 61615
Phone: 800-645-2402

Know All Men by These Presents:

That this Power of Attorney is not valid or in effect unless attached to the bond which it authorizes executed, but may be detached by the approving officer if desired.

That **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, each an Illinois corporation, (separately and together, the "Company") do hereby make, constitute and appoint:

Glenn Glubiak, David A. Goldstein, Jennifer Spadaro, Penny Rocco, jointly or severally

in the City of Melville, State of New York its true and lawful Agent(s) and Attorney(s) in Fact, with full power and authority hereby conferred, to sign, execute, acknowledge and deliver for and on its behalf as Surety, in general, any and all bonds and undertakings in an amount not to exceed **Twenty Five Million** Dollars (**$25,000,000.00**) for any single obligation.

The acknowledgment and execution of such bond by the said Attorney in Fact shall be as binding upon the Company as if such bond had been executed and acknowledged by the regularly elected officers of the Company.

RLI Insurance Company and/or **Contractors Bonding and Insurance Company**, as applicable, have each further certified that the following is a true and exact copy of a Resolution adopted by the Board of Directors of each such corporation, and is now in force, to-wit:

> "All bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, any Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or Agents who shall have authority to issue bonds, policies or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile."

IN WITNESS WHEREOF, the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, as applicable, have caused these presents to be executed by its respective Vice President with its corporate seal affixed this 10th day of June, 2020.

CONTRACTORS BONDING AND INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI Insurance Company
Contractors Bonding and Insurance Company

By: B. W. D.
Barton W. Davis — Vice President

State of Illinois }
County of Peoria } SS

On this 10th day of June, 2020, before me, a Notary Public, personally appeared Barton W. Davis, who being by me duly sworn, acknowledged that he signed the above Power of Attorney as the aforesaid officer of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** and acknowledged said instrument to be the voluntary act and deed of said corporation.

By: Catherine D. Glover
Catherine D. Glover — Notary Public

CATHERINE D. GLOVER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
March 24, 2024

CERTIFICATE

I, the undersigned officer of **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, do hereby certify that the attached Power of Attorney is in full force and effect and is irrevocable; and furthermore, that the Resolution of the Company as set forth in the Power of Attorney, is now in force. In testimony whereof, I have hereunto set my hand and the seal of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** this 5th day of October, 2023.

RLI Insurance Company
Contractors Bonding and Insurance Company

By: Jeffrey D Fick
Jeffrey D Fick — Corporate Secretary

RLI®
SURETY

P.O. BOX 3967 PEORIA, IL 61612-3967
P: (800)645-2402 E: asksurety@rlicorp.com
RLISURETY.COM

RLI Insurance Company

December 31, 2022

Admitted Assets

Investments:	
Fixed maturities	$ 1,343,631,923
Equity securities	1,268,806,758
Short-term investments	3,054,500
Real estate	27,014,108
Properties held to produce income	0
Cash and cash equivalents	57,699,481
Other invested assets	53,001,785
Receivables for securities	203,933
Agents' balances	88,924,498
Investment income due and accrued	10,365,084
Funds held	0
Reinsurance recoverable on paid losses	10,825,931
Federal income taxes receivable	1,430,379
Net deferred tax asset	11,010,858
Guarantee funds receivable or on deposit	0
Electronic data processing equipment, net of depreciation	755,308
Receivable from affiliates	0
Other admitted assets	39,343,761
Total Admitted Assets	$ 2,916,068,307

Liabilities and Surplus

Liabilities:	
Reserve for unpaid losses and loss adjustment expenses	$ 830,658,551
Unearned premiums	354,155,024
Accrued expenses	97,292,026
Funds held	422,374
Advance premiums	19,971,481
Amounts withheld	84,822,062
Remittances and items not allocated	1,448,394
Dividends declared and unpaid	44,327
Ceded reinsurance premium payable	28,148,458
Payable for securities	2,248,339
Statutory penalties	785,200
Current federal & foreign income taxes	0
Net deferred tax liability	0
Borrowed money and accrued interest	50,036,167
Drafts outstanding	0
Payable to affiliate	33,879,630
Other liabilities	4,231,114
Total Liabilities	$ 1,508,143,147
Surplus:	
Common stock	$ 10,000,375
Additional paid-in capital	242,451,084
Unassigned surplus	1,155,473,701
Total Surplus	$ 1,407,925,160
Total Liabilities and Surplus	$ 2,916,068,307

State of Illinois
County of Peoria }

The undersigned, being duly sworn, says: That he is the President of ***RLI Insurance Company****; that said Company is a corporation duly organized, in the State of Illinois, and licensed and engaged in business in the State of* New York *and has duly complied with all the requirements of the laws of said State applicable of 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 approved July 1947, 6U.S.C sec. 6-13; and that to the best of his knowledge and belief the above statement is a full, true, and correct statement of the financial condition of the said Company on the 31st day of December 2022.*

Attest:

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

{ Corporate Seal Affixed }

Craig Kliethermes — President

Olga S. Happel — Assistant Secretary

Sworn to before me this 10th day of March, 2023.

CATHERINE D. GEIGER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
December 05, 2026

{ Notarial Seal Affixed }

Catherine D. Geiger — *Notary Public, State of Illinois*

M0058323_Portal

SPECIAL EXPERIENCE REQUIREMENTS

Special Experience Requirements apply as indicated below.

Special Experience Requirements are **not** applicable to **the Bidder for General Construction Work** for this contract since the Department of Design and Construction has established a pre-qualified list ("**PQL"**) of contractors for furnishing all labor, materials and equipment, necessary and required to perform work on facilities determined by the City to be General Construction – Large Projects. This procurement for the specified work is being advertised and let solely to bidders who were previously pre-qualified based on their prior experience, and placed on the General Construction – Large Projects PQL. Bids submitted by other than such pre-qualified bidders will be rejected as non-responsive bids. The below listed Special Experience Requirements apply solely to the Contractor/Sub-contractor performing the specific area(s) of work shown and the manufacturer that will supply or fabricate specific material or equipment.

Bidder(s):	**Plumbing Work**	**___X___ YES**	**_____ NO**
	HVAC Work	**___X___ YES**	**_____ NO**
	Electrical Work	**___X___ YES**	**_____ NO**
Specific Areas of Work:	**General Construction Work**	**___X___ YES**	**_____ NO**

(A) **SPECIAL EXPERIENCE REQUIREMENTS FOR THE BIDDER IF APPLICABLE:** The special experience requirements set forth below apply to the bidder only if indicated above. Compliance with such special experience requirements will be determined solely by the City prior to an award of contract. Failure to comply with the special experience requirements will result in the rejection of the bid as non-responsive.

- The bidder must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

(B) **QUALIFICATION FORM**: For each project submitted to demonstrate compliance with the special experience requirements, the bidder(s) indicated above must complete the Qualification Form included in PASSPort. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

(C) **CONDITIONS**: The City may, in determining compliance with the special experience requirements set forth above, consider prior projects completed by principal(s) or other employees of the bidder while affiliated with another entity, subject to the conditions set forth below.

- Any principal or other employee on whose prior experience the bidder is relying to demonstrate compliance with this special experience requirement must have held the following: (a) a significant management role in the prior entity with which he/she was affiliated, and (b) a significant management role in the entity submitting the bid for a period of six months or from the inception of the bidding entity. If the bidder is relying on the prior experience of a principal or employee, it must submit documentation confirming the position held by such principal or employee in the prior entity, as well as in the bidding entity.

- The bidder may not rely on the experience of its principals or other employees to demonstrate compliance with any other requirements, including without limitation, financial requirements or requirements for a specified minimum amount of annual gross revenues.

(D) **SPECIAL EXPERIENCE REQUIREMENTS FOR SPECIFIC AREAS OF WORK**: The special experience requirements set forth below apply to the contractor or subcontractor that will perform specific areas of work. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of such award, the contractor will be required to submit the qualifications of the contractor or subcontractor that will perform these specific areas of work. If the bidder intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the bidder intends to subcontract

these specific areas of work, its proposed subcontractor(s) must demonstrate compliance with the special experience requirements. Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City. The bidder is advised to carefully review these special experience requirements prior to submitting its bid, as such experience requirements will be strictly enforced.

(1) Special experience requirements apply to the contractor or subcontractor that will perform specific areas of work specified in the section(s) set forth below.

General Construction Work

- Section 07 52 13: Atactic-Polypropylene-Modified Bituminous Membrane Roofing

(2) Special experience requirements applicable to the contractor or subcontractor who will perform specific areas of work are summarized below.

- The contractor or subcontractor performing the work of this section must meet the requirements of DDC General Conditions Section 014000 "Quality Requirements," Article 1.7.C.3.

(3) For each project submitted to demonstrate compliance with the special experience requirements for specific areas of work, the contractor or proposed subcontractor will be required to complete the Qualification Form included in PASSPort.

a. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

b. The contractor or subcontractor must specify, for each qualifying project submitted, the type of roofing system utilized and provide proof that the manufacturer's warranty for that project was issued. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information required to be provided by the contractor or subcontractor on the Qualification Form is actually provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

* See attached for more information *

QUALIFICATION FORM

Name of Contractor: NYS Parks & Recreation

Name of Project: Riverbank State Park - Theater Upgrade Denny Farrell Park

Location of Project: New York, NY

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

Name: Maxfield Schaefer

Title: District manager Phone Number: 212-866-3535

Brief description of the Project completed or the Project in progress: Theater Upgrade, New AV System, New Lighting System

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

Amount of Contract, Subcontract or Sub-subcontract: $1,086,747 ~

Start Date and Completion Date: 4/18 → 5/19

****

Name of Contractor: Gryphon Construction Inc

Name of Project: Renovate Vanderclute Hall For SUNY Maritime College

Location of Project: Throgs Neck, NY

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

Name: Nidhi Beedu

Title: Project Manager Phone Number: 732-253-7842

Brief description of the Project completed or the Project in progress: New Fire Alarm, New Lighting

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

Amount of Contract, Subcontract or Sub-subcontract: $2,112,973 ~

Start Date and Completion Date: 10/21 → 10/23

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Riverbank State Park - Theater Upgrade** **Denny Farrell Park**
Work Performed:	Theater Upgrade New AV System, New Lighting System
Agency/Owner	NYS Department of Parks & Recreation
Project/Contract #	D005320
Proj. Location:	679 Riverside Drive, NY NY
Arch/Engineer:	W X Y Architecture 212-219-1953
Contract Dollar Amt. Current Contract Amt. Percent Completed:	$955,317.00 $1,086,747.00 100%
Surety Co.:	RLI Insurance
Award Date: Start Date:	February 1, 2018 April 12, 2018
Completion Date:	5/2019
Project Manager:	NYS Parks- Maxfield Schnaufer 212-866-3535 Maxfield.Schnaufer@parks.ny.gov
Const. Manager:	Hill International - John Swartzwelder JohnSwartzwelder@hillintl.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Renovate Vander Clute Hall for Student Union SUNY Maritime College**
Scope Of Work:	**Interior Fit Out to Campus Hall/Study Hall New Fire Alarm. New Lighting**
Agency/Owner	State University Construction Fund
Project/Contract #	211026-00
Proj. Location:	SUNY Maritime College, Throgs Neck, NY
Arch/Engineer:	JMZ Architects & Planners
Contract Dollar Amt. Current Contract Amt.	$1,660,000.00 $2,112,973.00
Percent Complete:	100%
Surety Co.	N/A
Award Date	July 1, 2021
Commencement Date:	October 2021
Completion Date:	Est. October 2023
Construction Manager:	Gryphon Construction, Inc.
Project Manager:	Nidhi Beedu
Phone # Supervisor	732-253-7842

* See attached for more information *

QUALIFICATION FORM

Name of Contractor: Lawrence Public Schools

Name of Project: Lawrence Middle School Auditorium Improvement

Location of Project: Lawrence, NY

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

Name: Craig Cammarota

Title: Director of Facilities Phone Number: 516-295-7045

Brief description of the Project completed or the Project in progress: Upgrade to Theatrical Lighting, Sound System & General Lighting

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

Amount of Contract, Subcontract or Sub-subcontract: $ 418,985.00

Start Date and Completion Date: 5/18 → 6/20

****

Name of Contractor: Jericho UFSD

Name of Project: Jericho UFSD Capital Improvement Program

Location of Project: Jericho, NY

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

Name: Michael Hahn

Title: Director of Facilities Phone Number: 516-203-3600

Brief description of the Project completed or the Project in progress: New Generator/ATS, New Fire Alarm, New PA, New Clock, Theatrical Lighting

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

Amount of Contract, Subcontract or Sub-subcontract: $ 4,185,400.00

Start Date and Completion Date: 6/17 → 8/18

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Lawrence Middle School** **Auditorium Improvement**
Work Performed:	Upgrades to Theatrical Lighting, Sound System & General Lighting
Agency/Owner	Lawrence UFSD
Proj. Location:	Lawrence Middle School 195 Broadway, Lawrence NY
Arch/Engineer:	Mark Design Studio Architecture, PC Michael Mark 516-827-0240
Contract Dollar Amt.	$407,317.00
Contract Change:	$418,985.00
Percent Complete:	100%
Surety Co.	RLI Insurance
Award Date	May 25, 2018
Completion Date:	June 30, 2020
Project Manager:	Craig Cammarata
Phone # Supervisor	516-295-7045

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Jericho UFSD** **Capital Improvement Program Ph2**
Work Performed:	New Generator & ATS, New Fire Alarm, New PA, Clock System New Lighting, Theatrical Lighting, Sound Systems, New Electrical Panels
Agency/Owner	Jericho Union Free School District
Project/Contract #	28-05-15-03-0-003-040 HS/MS 28-05-15-03-0-005-016 Cantiague 28-05-15-03-0-014-013 Seaman
Proj. Location:	Jericho HS/MS - Jericho NY Cantiague and Seaman Elementary School
Arch/Engineer:	John A. Grillo Architect, P.C.
Contract Dollar Amt.	$4,185,400.00
Percent Complete:	100%
Surety Co.	RLI Insurance
Award Date	June 1, 2017
Completion Date:	August 15, 2018
Construction Manager	SCC Construction Managment Edgardo Barbosa eb@scc-cm.com
Phone # Supervisor:	631-954-8158
Jericho Theater Director:	Ms. Kati Behr kbehr@jerichoschools.org
Phone #:	516-203-3600 x3233
Jericho Representative: Phone #:	Mr. Michael Hahn mhahn@jerichoschools.org 516-203-3600 x 3233

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

$	145.20
$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
		DIVISION 01 - GENERAL REQUIREMENTS										
						General Requirements: (for details see tab "HardCostGeneralRequirements" at Division 1 General Requirements sheet)	1.00	JOB				
						SUB TOTAL						
		DIVISION 02 - EXISTING CONDITIONS										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 03 - CONCRETE										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 04 - MASONRY										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 05 - METALS										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 06 - WOOD, PLASTICS, COMPOSITES										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 07 - THERMAL AND MOISTURE PROTECTION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 08 - OPENINGS										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						

Department of Design and Construction

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Project Name: Nuyorica Poets Café Alteration / Enlargement

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		DIVISION 09 - FINISHES										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 10 - SPECIALTIES										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 11 - EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 12 - FURNISHINGS										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 13 - SPECIAL CONSTRUCTION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 14 - CONVEYING EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 21 - FIRE SUPPRESSION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 22 - PLUMBING										
												$ -
												$ -

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

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		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 25 - INTEGRATED AUTOMATION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 26 - ELECTRICAL										
			26 05 00 Common Work Results for Electrical			Misc Demo, Removals	1.00	LF	$ -	$ 14,343.94	$ -	$ 14,343.94
			26 05 19 Low-Voltage Electrical Power Conductors and Cables							$ -	$ -	$ -
						#12 Wire	62,903.00	LF	$ 17,658.13	$ 62,473.25	$ -	$ 80,131.38
						#10 Wire	4,882.00	LF	$ 1,970.06	$ 5,940.98	$ -	$ 7,911.04
						#8 Wire	1,660.00	LF	$ 1,135.86	$ 2,472.99	$ -	$ 3,608.85
						#16 Wire	318.00	LF	$ 496.56	$ 315.83	$ -	$ 812.39
						#6 Wire	986.00	LF	$ 1,003.36	$ 1,795.32	$ -	$ 2,798.68
						#4 Wire	834.00	LF	$ 1,273.03	$ 17,946.55	$ -	$ 19,219.58
						#2 Wire	3,128.00	LF	$ 7,408.90	$ 7,766.57	$ -	$ 15,175.48
						#1 Wire	456.00	LF	$ 1,384.09	$ 1,434.13	$ -	$ 2,818.22
						#2/0 Wire	320.00	LF	$ -	$ -	$ -	$ -
						#3/0 Wire	520.00	LF	$ 3,038.09	$ 2,237.94	$ -	$ 5,276.03
						350Mcm Wire	600.00	LF	$ 7,221.52	$ 3,774.04	$ -	$ 10,995.56
						600Mcm Wire	1,520.00	LF	$ 33,202.16	$ 12,076.92	$ -	$ 45,279.08
						12/2 w/Ground, MC, Aluminum Armor	9,944.00	LF	$ 10,525.72	$ 49,380.31	$ -	$ 59,906.04
			26 05 26 Grounding and Bonding for Electrical Systems			Grounding and Bonding	1.00	PRJC	$ 3,911.37	$ 7,849.40	$ -	$ 11,760.77
			26 05 29 Hangers and Supports for Electrical Systems			Hangers & Supports	1.00	PRJC	$ 26,364.65	$ 32,850.26	$ -	$ 59,214.91
			26 05 33 Raceway and Boxes for Electrical Systems						$ -	$ -	$ -	$ -
						3/4" Emt w/ Fittings	15,820.00	LF	$ 45,520.15	$ 137,531.65	$ -	$ 183,051.81

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

$	145.20
$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
						1" Emt w/ Fittings	700.00	LF	$ 3,524.79	$ 10,428.26	$ -	$ 13,953.05
						1 1/4" Emt w/ Fittings	550.00	LF	$ 4,352.04	$ 10,924.85	$ -	$ 15,276.89
						1 1/2" Emt w/ Fittings	280.00	LF	$ 2,760.88	$ 6,488.70	$ -	$ 9,249.58
						2" Emt w/ Fittings	265.00	LF	$ 3,319.69	$ 7,018.39	$ -	$ 10,338.08
						2 1/2" Emt w/ Fittings	95.00	LF	$ 2,165.14	$ 3,459.54	$ -	$ 5,624.68
						3" Emt w/ Fittings	120.00	LF	$ 3,398.12	$ 5,363.11	$ -	$ 8,761.22
						4" Emt w/ Fittings	150.00	LF	$ 4,521.35	$ 6,703.88	$ -	$ 11,225.23
						3/4" Flex Cdt	1,517.00	LF	$ 17,581.14	$ 32,643.78	$ -	$ 50,224.92
						3/4" Imc w/ Fittings	630.00	LF	$ 4,653.46	$ 13,556.74	$ -	$ 18,210.20
						1 1/4" Rgs w/ Fittings	34.00	LF	$ 682.43	$ 1,125.59	$ -	$ 1,808.02
						1 1/2" Rgs w/ Fittings	287.00	LF	$ 4,426.13	$ 5,700.78	$ -	$ 10,126.91
						2" Rgs w/ Fittings	65.00	LF	$ 1,126.29	$ 1,886.19	$ -	$ 3,012.48
						4" Rgs w/ Fittings	180.00	LF	$ 20,796.09	$ 29,074.99	$ -	$ 49,871.08
						Concrete Encasement	110.00	LF	$ -	$ -	$ -	$ -
			26 05 33.16 Boxes for Electrical Systems			Boxes	1.00	PRJC	$ 10,877.90	$ 28,470.82	$ -	$ 39,348.72
			26 05 53 Identification for Electrical Systems			Identification	1.00	PRJC	$ 9,425.00	$ 6,621.12	$ -	$ 16,046.12
			26 05 73 Power System Studies			Power System Studies	1.00	PRJC	$ 7,975.00	$ 5,130.00	$ -	$ 13,105.00
			26 08 00 Commissioning of Electrical Systems			Commissioning, Electrical Systems	1.00	PRJC	$ 12,281.50	$ 23,339.45	$ -	$ 35,620.95
			26 09 23 Lighting Control Devices		Yes				$ -	$ -	$ -	$ -
						$3M,D	2.00	EA	$ -	$ 55.29	$ -	$ 55.29
						$5M,3,D QSWS2-5BRLN-WH	2.00	EA	$ -	$ 55.29	$ -	$ 55.29
						$EXTR	3.00	EA	$ -	$ 82.93	$ -	$ 82.93
						$L	11.00	EA	$ -	$ 304.07	$ -	$ 304.07
						$O/V,D	10.00	EA	$ -	$ 276.43	$ -	$ 276.43
						(OC) Ceiling Mtd Occupancy Sensor LRF2-OCR2B-P-WH 434MHZ Wireless	37.00	EA	$ -	$ 2,204.83	$ -	$ 2,204.83
						$- Single Pole Switches Lutron Nova-T-NT-1PS-SN	3.00	EA	$ -	$ 82.93	$ -	$ 82.93
						$- Elevator Pit	1.00	EA	$ -	$ 27.64	$ -	$ 27.64
						Testing, programming and labelling of System	69.00	EA	$ 1,815.91	$ 2,855.36	$ -	$ 4,671.27

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

	$	145.20
	$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
									$ -	$ -	$ -	$ -
			26 09 43 Network Lighting Controls		Yes	Lighting Control Quote	1.00	EA	$ -	$ -	$ 234,954.78	$ 234,954.78
						LUT-LTE-1 LTE Modem	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						QSPS-DH-1-75 w/ Lutron 8"x 8" x4" Enclosure	3.00	EA	$ -	$ 372.44	$ -	$ 372.44
						QP5-2L-POE Athena Light Management Hub containing (1) Athena Edge Processor, (2) QS Links, (1) 8 Port Unmanaged POE Switch in enclosure	3.00	EA	$ -	$ 7,945.34	$ -	$ 7,945.34
						QSM2-4-W-C Quantum Sensor Module w/ (4) Universal wired inputs and 434 MHZ Wireless Receiver	7.00	EA	$ -	$ 753.15	$ -	$ 753.15
						QSN2-4T20-S: 20A Energi Savr Node QS (ESN) Rated to switch 20A Receptacles	12.00	EA	$ -	$ 15,890.69	$ -	$ 15,890.69
						LUT-ELI-3PH Emergency Lighting Interface	6.00	EA	$ -	$ 1,489.75	$ -	$ 1,489.75
						PP-DV Power Supply	6.00	EA	$ -	$ 993.17	$ -	$ 993.17
						QSWS2-2BN-WH 2 Button Scene	1.00	EA	$ -	$ 41.38	$ -	$ 41.38
						QSWS2-3BRLN-WH 3 Button Select with Raised Cover QSWS2-KSN	1.00	EA	$ -	$ 41.38	$ -	$ 41.38
						QSWS2-5BRLN-WH	2.00	EA	$ -	$ 82.76	$ -	$ 82.76
						VIVE HUB External Power Supply HJS-0-FM	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						RMJS-8TN-DV-B Powpak Relay Module	4.00	EA	$ -	$ 331.06	$ -	$ 331.06
						RMJS-16R-DV-B Powpak Relay Module	3.00	EA	$ -	$ 248.29	$ -	$ 248.29
						QSN-4A5-S Energi Savr Node ES (ESN) w/ (4) Phase Dimming Outputs and (1) QS Communication Link	3.00	EA	$ -	$ 3,972.67	$ -	$ 3,972.67
						Q-RF Athena Clear Connect Gateway Type X Communication with up tom 100 clear Connect	2.00	EA	$ -	$ 1,655.28	$ -	$ 1,655.28
						Ketra Series PAR30 Track Light CM-TAS30XXGTXX11G24XXXXXXX	2.00	EA	$ -	$ 1,655.28	$ -	$ 1,655.28
						Ketra Series PAR380 Track Light CM-TAS38XXGTXX11G24XXXXXXX	2.00	EA	$ -	$ 1,655.28	$ -	$ 1,655.28
						QSE-IO Contact Closure Interface	1.00	EA	$ -	$ 165.53	$ -	$ 165.53
						PJ2-2B-GWH PICO Wireless	4.00	EA	$ -	$ 165.53	$ -	$ 165.53
						PJ2-3BRL-GWH PICO Wireless	1.00	EA	$ -	$ 41.38	$ -	$ 41.38
						PJ2-22RL-GWH PICO Wireless	1.00	EA	$ -	$ 41.38	$ -	$ 41.38
						CAR2S-20-STR-WH	2.00	EA	$ -	$ 82.76	$ -	$ 82.76
						Testing, programming and labelling of System	164.00	EA	$ 4,316.07	$ 6,786.65	$ -	$ 11,102.72
									$ -	$ -	$ -	
									$ -	$ -	$ -	$ -
			26 09 61 Theatrical Lighting Controls			Theatrical Lighting Controls	1.00	EA	$ -	$ -	$ 339,927.50	$ 339,927.50

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

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	$	145.20

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						Theatrical Lighting Controls Testing	1.00	EA	$ -	$ -	$ 11,000.00	$ 11,000.00
						Theater System Integrator, Warranty	1.00	EA	$ -	$ -	$ 16,500.00	$ 16,500.00
			26 09 63 Theatrical Lighting Controls Installation						$ -	$ -	$ -	$ -
						Stage Panel PB-FF1F: 100 Amps, 120/208V, 3PH 42 Ckts	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Stage Panel PB-TF2F: 100 Amps, 120/208V, 3PH 42 Ckts	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Relay Panel RP-FF1F: 200 Amps, 3PH, 4W, 48 Cts	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Company Switch: CS-FF1F: 125 Amps, 120/208V, 3PH, 4W	1.00	EA	$ -	$ 993.17	$ -	$ 993.17
						Company Switch: CS-TF2F: 125 Amps, 120/208V, 3PH, 4W	1.00	EA	$ -	$ 993.17	$ -	$ 993.17
						ELTS: Emergency Transfer Switch	1.00	EA	$ -	$ 2,648.45	$ -	$ 2,648.45
						Dimmer Rack: DR-TF1F: 400 Amps, 120/208V, 3Ph, 4W, 96 Ckts	1.00	EA	$ -	$ 5,959.01	$ -	$ 5,959.01
						Outlet Device A:	10.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Outlet Device B:	10.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Outlet Device C:	9.00	EA	$ -	$ 2,979.50	$ -	$ 2,979.50
						Outlet Device D:	7.00	EA	$ -	$ 2,317.39	$ -	$ 2,317.39
						Outlet Device E:	6.00	EA	$ -	$ 1,986.34	$ -	$ 1,986.34
						Special Outlet Device (SP):	2.00	EA	$ -	$ 1,655.28	$ -	$ 1,655.28
						Houselight Preset Station	4.00	EA	$ -	$ 629.01	$ -	$ 629.01
						Houselighting Master Station	3.00	EA	$ -	$ 496.58	$ -	$ 496.58
						Remote Data Station	2.00	EA	$ -	$ 662.11	$ -	$ 662.11
						20 Amp, 3P Circuit Breaker	1.00	EA	$ -	$ 165.53	$ -	$ 165.53
						PHMS: Portable House light Master Station	2.00	EA	$ -	$ 662.11	$ -	$ 662.11
						GRX- PCBL-46L Plenum Rated Cable	1,500.00	LF	$ 9,579.57	$ 2,234.63	$ -	$ 11,814.20
						Belden 8471 (1) #14 AGW Wire Houselighting Control Cable	2,220.00	LF	$ 9,737.48	$ 3,307.25	$ -	$ 13,044.72
						1 1/2" Black Galv Pipe	820.00	LF	$ -	$ -	$ -	$ -

Department of Design and Construction

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									$ -	$ -	$ -	$ -
			26 24 16 Panelboards		Yes	PANELBOARD QUOTE FOR EQQUIPMENT LIST BELOW	1.00	EA	$ -	$ -	$ 226,531.25	$ 226,531.25
						MDP: 1600 Amps, 120/208V, 3PH, 4W 42 Ckts, 100 KAIC Ratings (1) Section	1.00	EA	$ -	$ 9,931.68	$ -	$ 9,931.68
						1600 CT Cabinet & Main Switch 1600AS/1200AF	1.00	EA	$ -	$ 3,972.67	$ -	$ 3,972.67
						400 Amps 3P, 240, Service Switch Fused @ 400 Amps Combined with Con Edison Meter	1.00	EA	$ -	$ 11,586.96	$ -	$ 11,586.96
						Base Building Meter	1.00	EA	$ -	$ 13,242.24	$ -	$ 13,242.24
						Service End Box	1.00	EA	$ -	$ 827.64	$ -	$ 827.64
						Panel PLP-C: 400 Amps, 120/208V, 3PH, 4W, 80 Ckts, 42 Kaic Ratings	1.00	EA	$ -	$ 5,147.92	$ -	$ 5,147.92
						Panel PLP-1: 200 Amps, 120/208V, 3PH, 4W, 60 Ckts, 42 Kaic Ratings	1.00	EA	$ -	$ 4,939.36	$ -	$ 4,939.36
						Panel PLP-2: 100 Amps, 120/208V, 3PH, 4W, 42 Ckts, 22 Kaic Ratings	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Panel PLP-3: 100 Amps, 120/208V, 3PH, 4W, 42 Ckts, 22 Kaic Ratings	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Panel PLP-4: 100 Amps, 120/208V, 3PH, 4W, 42 Ckts, 22 Kaic Ratings	1.00	EA	$ -	$ 3,310.56	$ -	$ 3,310.56
						Panel MP-3: 400 Amps, 120/208V, 3PH, 4W, 42 Ckts, 42 Kaic Ratings	1.00	EA	$ -	$ 5,147.92	$ -	$ 5,147.92
						Panel PT: 600 Amps, 120/208V, 3PH, 4W, 30 Ckts, 65 Kaic Ratings	1.00	EA	$ -	$ 11,669.72	$ -	$ 11,669.72
						Elevator Cab Light DS: 30 Amps, 1P,240V Disconnect Switch	1.00	EA	$ -	$ 331.06	$ -	$ 331.06
						Elevator Disconnect Switch 100 Amps, 3P,240V	1.00	EA	$ -	$ 662.11	$ -	$ 662.11
									$ -	$ -	$ -	$ -
			26 27 26 Wiring Devices			Duplex Receptacles	56.00	EA	$ 3,733.58	$ 1,232.85	$ -	$ 4,966.43
						Receptacles GFI	27.00	EA	$ 4,500.29	$ 746.37	$ -	$ 5,246.66
						Receptacles Quad	50.00	EA	$ 6,667.10	$ 3,724.38	$ -	$ 10,391.48
						Floor Power Outlet	3.00	EA	$ 3,947.63	$ 993.17	$ -	$ 4,940.79
						Receptacles GFI WP	5.00	EA	$ 1,096.56	$ 138.22	$ -	$ 1,234.78
						Receptacles L5-20	3.00	EA	$ 115.80	$ 82.93	$ -	$ 198.73
						30/2 Amp Receptacles	1.00	EA	$ 105.27	$ 27.64	$ -	$ 132.91

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

$	145.20
$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
						40/2 Amp Receptacles	1.00	EA	$ 166.68	$ 82.76	$ -	$ 249.44
			26 28 13 Fuses			N/A	-	EA	$ -	$ -	$ -	
			26 28 16.13 Enclosed Circuit Breakers			N/A	-	EA	$ -	$ -	$ -	
			26 28 16.16 Enclosed Switches						$ -	$ -	$ -	
						20/2 Amp Disconnect	14.00	EA	$ 3,561.64	$ 4,055.44	$ -	$ 7,617.07
						30/2 Amp Disconnect	2.00	EA	$ 508.81	$ 579.35	$ -	$ 1,088.15
						30 Amp Disconnect	2.00	EA	$ 1,122.88	$ 728.32	$ -	$ 1,851.20
						60/2 Amp Disconnect	2.00	EA	$ 1,508.87	$ 1,158.70	$ -	$ 2,667.57
						60 Amp Disconnect WP	1.00	EA	$ 1,315.88	$ 579.35	$ -	$ 1,895.22
						100 Amp Disconnect	1.00	EA	$ 1,008.84	$ 744.88	$ -	$ 1,753.71
						100 Amp Disconnect WP	3.00	EA	$ 10,263.83	$ 2,234.63	$ -	$ 12,498.45
						200 Amp Disconnect, Refeed Ex Elev	1.00	EA	$ 3,947.63	$ 993.17	$ -	$ 4,940.79
						Manual Snap Switch Starter	8.00	EA	$ 1,894.86	$ 993.17	$ -	$ 2,888.03
			26 29 13 Enclosed Controllers			Install Jockey Pump Controller FBO	1.00	EA	$ -	$ 82.76	$ -	$ 82.76
						Install Fire Pump Controller 30HP FBO	1.00	EA	$ -	$ 243.33	$ -	$ 243.33
			26 33 23 Central Battery Equipment			5KVA Battery Inverter w/ 6 Integral 20Amp Circuit Breakers & 2 Integral 30 Amp Breakers 120/208V, 3PH, 4W , Included in Quote	1.00	EA	$ -	$ 11,586.96	$ -	$ 11,586.96
			26 43 13 Surge Protective Devices for Low-Voltage Electrical Power Circuits			Surge Protective Devices	1.00	EA	$ 942.50	$ 496.58	$ -	$ 1,439.08
			26 50 00 Lighting			Light Fixture and Lighting Control Quote	1.00	EA	$ -	$ -	$ 279,735.49	$ 279,735.49
						Exit Signs	26.00	EA	$ -	$ 4,303.73	$ -	$ 4,303.73
						Jelly Jar -Lithonia LED OLVTWM 15W, 4000K	1.00	EA	$ -	$ 165.53	$ -	$ 165.53
						Type TA	22.00	EA	$ -	$ 3,641.62	$ -	$ 3,641.62
						Type TA-1	13.00	EA	$ -	$ 2,151.86	$ -	$ 2,151.86
						Type TC	41.00	EA	$ -	$ 6,786.65	$ -	$ 6,786.65
						Type TD 2" Black Pipe 30FT	4.00	EA	$ -	$ 662.11	$ -	$ 662.11

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

	$	145.20
	$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
						Type TD LED Retrofit Wall Washers	39.00	EA	$ -	$ 9,683.39	$ -	$ 9,683.39
						Type TE: 4FT	1.00	EA	$ -	$ 206.91	$ -	$ 206.91
						Type TE: 9FT	1.00	EA	$ -	$ 331.06	$ -	$ 331.06
						Type TF	2.00	EA	$ -	$ 496.58	$ -	$ 496.58
						Type TG	3.00	EA	$ -	$ 993.17	$ -	$ 993.17
						Type TJ	8.00	EA	$ -	$ 1,324.22	$ -	$ 1,324.22
						Type TK-1	3.00	EA	$ -	$ 496.58	$ -	$ 496.58
						Type TK-2	5.00	EA	$ -	$ 827.64	$ -	$ 827.64
						Type TK	2.00	EA	$ -	$ 331.06	$ -	$ 331.06
						Type TL-1 not shown on fixture schedule	1.00	EA	$ -	$ 248.29	$ -	$ 248.29
						Type TM: 3FT	98.00	EA	$ -	$ 16,221.74	$ -	$ 16,221.74
						Type TM-1: 3FT	33.00	EA	$ -	$ 5,462.42	$ -	$ 5,462.42
						Type TM-3: 3FT	11.00	EA	$ -	$ 1,820.81	$ -	$ 1,820.81
						Type TM-4- 4FT	18.00	EA	$ -	$ 3,724.38	$ -	$ 3,724.38
						Type TQ	10.00	EA	$ -	$ 1,655.28	$ -	$ 1,655.28
						Type TS	9.00	EA	$ -	$ 1,489.75	$ -	$ 1,489.75
						Type TT - Pendant Light Fixtures	12.00	EA	$ -	$ 3,972.67	$ -	$ 3,972.67
						Type TW - 4FT	1.00	EA	$ -	$ 206.91	$ -	$ 206.91
						Type TXD	4.00	EA	$ -	$ 827.64	$ -	$ 827.64
						Type TY- Canopy Mtd LED	6.00	EA	$ -	$ 1,489.75	$ -	$ 1,489.75
						Type TZ- Canopy Mtd LED	15.00	EA	$ -	$ 3,724.38	$ -	$ 3,724.38
						Type TXA-2: 24 FT Mounted Above Sign on Extended Brackets	1.00	EA	$ -	$ 2,648.45	$ -	$ 2,648.45
		copy above cell and insert copied cell above the row										
						SUB TOTAL			**$ 347,838.24**	**$ 837,763.31**	**$ 1,108,649.02**	**$ 2,294,250.56**
		DIVISION 27 - COMMUNICATIONS										
			27 05 00 Common Work Results for Communications		Yes	Telecommunication Quote	1.00	EA	$ -	$ -	$ 23,043.63	$ 23,043.63

Department of Design and Construction

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Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

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	$	145.20

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						Belden#2148A Cat 6 Cable	22,462.00	LF	$ 43,744.63	$ 33,462.81	$ -	$ 77,207.44
						Riser Cores	5.00	FLR	$ 1,315.88	$ 1,241.46	$ -	$ 2,557.34
						WAP Outlet	10.00	EA	$ 186.68	$ 441.96	$ -	$ 628.64
						Data Outlet Backbox w/ Stubup	6.00	EA	$ 112.01	$ 265.18	$ -	$ 377.18
						Tel/Data Outlet Backbox w/ Stubup 2c	125.00	EA	$ 2,333.49	$ 5,524.50	$ -	$ 7,857.98
						Tel/Data Outlet Backbox w/ Stubup 4c	2.00	EA	$ 37.34	$ 88.39	$ -	$ 125.73
						Floor T/D Outlet	4.00	EA	$ 74.67	$ 176.78	$ -	$ 251.46
						4" Wall Sleeve	3.00	EA	$ 1,315.88	$ 993.17	$ -	$ 2,309.04
						40 RU Heavy Duty Wall Mounted Equipment Rack w/ (1) Patch Panel & (2) Tripp Lite PDU	1.00	EA	$ 87.87	$ 1,986.34	$ -	$ 2,074.21
						3/4" ACX Fire Rated Ply Board	3.00	EA	$ 500.03	$ 496.58	$ -	$ 996.62
			27 05 26 Grounding and Bonding for Communications Systems			Grounding and Bonding	1.00	PRJC	$ 725.00	$ 741.00	$ -	$ 1,466.00
			27 05 29 Hangers and Supports for Communications Systems			Hangers & Supports	1.00	PRJC	$ 725.00	$ 741.00	$ -	$ 1,466.00
			27 05 53 Identification for Communications Systems			Identification			$ -	$ -	$ -	$ -
			27 08 00 Commissioning of Communications			Commissioning, Electrical Systems	1.00	PRJC	$ 3,105.47	$ 4,883.08	$ -	$ 7,988.54
			27 11 16 Communications Cabinets, Racks, Frames, and Enclosures			IDF TTB, Racks, Etc			$ -	$ -	$ -	$ -
			27 11 19 Communications Termination Blocks and Patch Panels			Comm Term Blocks			$ -	$ -	$ -	$ -
			27 11 23 Communications Cable Management and Ladder Rack			Cable Tray	10.00	LF	$ 136.15	$ 1,506.30	$ -	$ 1,642.45
			27 15 13 Communications Copper Horizontal Cabling			Com Horiz Cabling			$ -	$ -	$ -	$ -
			27 15 43 Communications Faceplates and Connectors			Comm Term Blocks			$ -	$ -	$ -	$ -
			27 16 19 Communications Patch Cords, Station Cords, and Cross Connect Wire			Comm Patch Corse, Station Cords, Xconn			$ -	$ -	$ -	$ -
			27 41 16 Integrated Audio-Video Systems and Equipment						$ -	$ -	$ -	$ -
						Audio Digital Belden 1801B	2,000.00	LF	$ 8,281.24	$ 3,310.56	$ -	$ 11,591.80
						Audio Speaker Belden #6000UE	1,500.00	LF	$ 6,210.93	$ 2,482.92	$ -	$ 8,693.85
						Control (Serial Applications) Belden 88723	1,500.00	LF	$ 12,895.58	$ 2,482.92	$ -	$ 15,378.50
						Control (Touch/Control System Applications) Belden 1502P	1,500.00	LF	$ 7,342.58	$ 2,482.92	$ -	$ 9,825.50

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Hard Cost Estimate (Level 2)

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	$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
						Cresnet Control Cable Crestrent-P	1,500.00	LF	$ 3,342.32	$ 2,482.92	$ -	$ 5,825.24
						Digital Media 8G Ultra Cable 4K Crestron DM-CBL-ULTRA-P	1,500.00	LF	$ 9,869.06	$ 2,482.92	$ -	$ 12,351.98
						Digiatl Media 8G Cable Crestron DM-CBL-8G-P	1,500.00	LF	$ 3,473.91	$ 2,482.92	$ -	$ 5,956.83
						Microphone Cabling Belden#9451P	1,500.00	LF	$ 2,500.16	$ 2,482.92	$ -	$ 4,983.08
						OM3 MM Corning T81-31180-29	1,000.00	LF	$ 2,140.49	$ 3,310.56	$ -	$ 5,451.05
						OM4 MM Corning T81-31190-29	1,000.00	LF	$ 2,631.75	$ 3,310.56	$ -	$ 5,942.31
						OS2 SM Corning T81-31131-29	1,000.00	LF	$ 1,929.95	$ 3,310.56	$ -	$ 5,240.51
						SMPTE 304M Camera Mohawk 96920	1,000.00	LF	$ 4,386.25	$ 3,310.56	$ -	$ 7,696.81
						RF (Hardline) Commscope P3-500 Series JCAR	1,500.00	LF	$ 15,132.56	$ 2,482.92	$ -	$ 17,615.48
						RF (COAX) Belden 1152A	1,500.00	LF	$ 14,474.63	$ 2,482.92	$ -	$ 16,957.55
						RF (COAX) Belden 1153A	1,500.00	LF	$ 14,027.23	$ 2,482.92	$ -	$ 16,510.15
						RF (COAX TRAIX) Belden 1859A	1,500.00	LF	$ 20,738.19	$ 2,482.92	$ -	$ 23,221.11
						RF (Wireless Antenna) Belden 89913	1,500.00	LF	$ 39,423.62	$ 4,965.84	$ -	$ 44,389.46
						RF (Microwave Antenna, Riser rated) Andrew LDF4-50A	1,500.00	LF	$ 7,105.73	$ 2,482.92	$ -	$ 9,588.65
						Shielded Twisted Pair Cable Extron 22-235-03	1,500.00	LF	$ 12,895.58	$ 2,482.92	$ -	$ 15,378.50
						Video UPT Belden 7987P	1,500.00	LF	$ 2,973.88	$ 2,482.92	$ -	$ 5,456.80
						Video Analog Component Belden 88281	1,500.00	LF	$ 20,527.65	$ 2,482.92	$ -	$ 23,010.57
						Video Digital Video Belden 1506A	1,500.00	LF	$ 8,684.78	$ 2,482.92	$ -	$ 11,167.70
						1 1/4" Emt w/ Fittings	640.00	LF	$ 5,064.19	$ 12,712.55	$ -	$ 17,776.74
						2" Emt w/ Fittings	730.00	LF	$ 9,144.80	$ 19,333.67	$ -	$ 28,478.48
						AV Outlet Backbox w/ Stubup	25.00	EA	$ -	$ -	$ -	$ -
						Conduit Term Box	1.00	EA	$ -	$ -	$ -	$ -
						Projector Roughin	1.00	EA	$ -	$ -	$ -	$ -
						Projection Screen Roughin	1.00	EA	$ -	$ -	$ -	$ -
						TV Display Roughin, Chiefbox	9.00	EA	$ 2,447.53	$ -	$ -	$ 2,447.53
						Speaker Backbox, CS clg	18.00	EA	$ 394.76	$ 396.27	$ -	$ 791.04
						Speaker Backbox, SP pend	25.00	EA	$ 548.28	$ 550.38	$ -	$ 1,098.66

Department of Design and Construction

CONTRACTOR'S DETAILED BID BREAKDOWN FORM

Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

$	145.20
$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:
										$ -	$ -	$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL			**$ 292,987.69**	**$ 146,786.78**	**$ 23,043.63**	**$ 462,818.10**
		DIVISION 28 - ELECTRONIC SAFETY AND SECURITY										
			28 05 00 Common Work Results for Electronic Safety and Security									
			28 10 00 Access Control		Yes	Access Control Quote	1.00	EA		$ -	$ 45,401.74	$ 45,401.74
						Belden 8723 - 2 Pair 22 AWG Shielded Low-Voltage	680.00	LF	$ 1,598.70	$ 1,013.03	$ -	$ 2,611.73
						Belden 9418 - 4 Conductors 18 AWG Shielded	595.00	LF	$ 2,923.00	$ 886.40	$ -	$ 3,809.40
						Belden#Belden 8777	525.00	LF	$ 2,689.65	$ 782.12	$ -	$ 3,471.77
						Belden Access Control Cable, (#22-3pr, #18-4c, #22-4c, #22-2c), Shielded, CMP	500.00	LF	$ 1,526.42	$ 1,324.22	$ -	$ 2,850.64
						Access Control Panel	1.00	EA	$ -	$ 662.11	$ -	$ 662.11
						Access Control Server	1.00	EA	$ -	$ 662.11	$ -	$ 662.11
						Power Supply	2.00	EA	$ -	$ 546.24	$ -	$ 546.24
						Card Readers	7.00	EA	$ -	$ 753.15	$ -	$ 753.15
						Door Contacts	8.00	EA	$ -	$ 860.75	$ -	$ 860.75
						(LK) Electrified Door Lock	4.00	EA	$ -	$ 430.37	$ -	$ 430.37
						(IC) Video Intercom	4.00	EA	$ -	$ 496.58	$ -	$ 496.58
						(ML) Magnetic Lock	1.00	EA	$ -	$ 107.59	$ -	$ 107.59
						(REX) Request to Exit Lock	2.00	EA	$ -	$ 215.19	$ -	$ 215.19
			28 20 00 Video Surveillance		Yes	Video Surveillance Quote	1.00	EA	$ -	$ -	$ 112,953.98	$ 112,953.98
						Video Surveillance Server	1.00	EA	$ -	$ 662.11	$ -	$ 662.11
						CCTV Camera	30.00	EA	$ -	$ 4,965.84	$ -	$ 4,965.84
						Belden#2148A Cat 6 Cable	2,250.00	LF	$ 4,381.86	$ 3,351.94	$ -	$ 7,733.81
						Video Surv Testing	1.00	PRJC	$ -	$ 2,850.00	$ -	$ 2,850.00
									$ -	$ -	$ -	
			28 46 00 Fire Detection and Alarm			Fire Alarm Quote	1.00	EA	$ -	$ -	$ 54,793.75	$ 54,793.75
						24V Power Supply - Relays	495.00	LF	$ 651.36	$ 655.49	$ -	$ 1,306.85

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	$	145.20
	$	145.20

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						A: 16 AWG, 2PR NYC FPLP Twisted Shielded Pair	3,555.00	LF	$ 10,291.46	$ 15,299.75	$ -	$ 25,591.21
						B: NAC Circuit Visual & Audio: 2PR #14 NYC Approved MC Fire Alarm Cable, FPLP, 14-2 Solid, Red Steel Flex	1,815.00	LF	$ 5,572.73	$ 7,811.27	$ -	$ 13,384.00
						C- Speaker Circuit: 14/2 Teflon NYC Approved	1,815.00	LF	$ 3,343.64	$ 7,811.27	$ -	$ 11,154.90
						FACU - Fire Alarm Control Station w/ Built in Purge Station & Duct Module	1.00	EA	$ -	$ 3,972.67	$ -	$ 3,972.67
						Remote Annunicator Panel	1.00	EA	$ -	$ 662.11	$ -	$ 662.11
						Duct Detector	7.00	EA	$ -	$ 2,317.39	$ -	$ 2,317.39
						Fan Shutdown Relay	4.00	EA	$ -	$ 331.06	$ -	$ 331.06
						Fire Smoke Damper with Control Relay/Duct Detector & Monitor Module	15.00	EA	$ -	$ 6,828.03	$ -	$ 6,828.03
						Elevator Recall	1.00	EA	$ -	$ 82.76	$ -	$ 82.76
						Monitor Module	7.00	EA	$ -	$ 753.15	$ -	$ 753.15
						Smoke Detector	12.00	EA	$ -	$ 993.17	$ -	$ 993.17
						Smoke Detector Recall	6.00	EA	$ -	$ 496.58	$ -	$ 496.58
						Smoke Detector Top of Elevator Shaft	1.00	EA	$ -	$ 82.76	$ -	$ 82.76
						Smoke Detecor Top of Stairs	2.00	EA	$ -	$ 165.53	$ -	$ 165.53
						Relay For Elevator Shaft Damper	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						Relay For Smoke Hatch	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						Recall	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						Relay For Smoke Louver	1.00	EA	$ -	$ 124.15	$ -	$ 124.15
						Tamper Switch	16.00	EA	$ -	$ 1,324.22	$ -	$ 1,324.22
						Wall Mtd Manual Fire Pull Station	12.00	EA	$ -	$ 993.17	$ -	$ 993.17
						Wall Mtd Fire Signal Combination Horn/Strobe	18.00	EA	$ -	$ 2,234.63	$ -	$ 2,234.63
						Wall Mtd Fire Signal Strobe	14.00	EA	$ -	$ 1,158.70	$ -	$ 1,158.70
						Water Flow Switch	5.00	EA	$ -	$ 289.67	$ -	$ 289.67
						Weather Proof Wall Mtd Fire Signal Combination Horn / Strobe	1.00	EA	$ -	$ 124.15	$ -	$ 124.15

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	$	145.20

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						Weather Proof Wall Mtd Manual Fire Pull Station	1.00	EA	$ -	$ 82.76	$ -	$ 82.76
						Fire Alarm Safety Switch, 30A, 2P, 240V/250DC, HD Fusible, NEMA 1 Eaton DH221FGK	1.00	EA	$ 508.81	$ 364.16	$ -	$ 872.97
						Testing, programming and labelling of System	129.00	EA	$ 1,471.15	$ 5,338.28	$ -	$ 6,809.43
		copy above cell and insert copied cell above the row										
						SUB TOTAL			**$ 34,958.76**	**$ 81,239.09**	**$ 213,149.48**	**$ 329,347.33**
		DIVISION 31 - EARTHWORK										
												$ -
												$ -
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 32 - EXTERIOR IMPROVEMENTS										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 33 - UTILITIES										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 34 - TRANSPORTATION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 40 - PROCESS INTEGRATION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						

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		DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 42 - PROCESS HEATING, COOLING, AND DRYING EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 45 - INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 46 - WATER AND WASTEWATER EQUIPMENT										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
		DIVISION 48 - ELECTRICAL POWER GENERATION										
												$ -
												$ -
		copy above cell and insert copied cell above the row										
						SUB TOTAL						
						Hard Cost:			**$ 675,784.69**	**$ 1,065,789.19**	**$ 1,344,842.12**	**$ 3,086,416.00**
						Hard Cost Summary(Including General Requirement):						**$ 3,086,416.00**

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Project ID: PV669-NPC

Project Name: Nuyorica Poets Café Alteration / Enlargement

Name of the Bidder: Interphase Electric Corp

Hard Cost Estimate (Level 2)

	$	145.20
	$	145.20

No.	Sub Work (*)	CSI Division:	CSI Sub Division:	RSMeans 12-digit item code:	Vendor Quote (Yes/ No)	Description:	Qty	Unit:	Total Cost of Material $:	Total Cost of Labor $:	Total Cost of Equipment $:	Grand total of Material,Labor & Eqp.$:

Note:

1. Bidders' total material,labor, and equipment costs are fully-loaded with markups
2. Quanity includes expected material wastage
3. (*) Identify possible Sub Contract Work items
4. Shaded cell is where data must be entered

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. 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)
See attachment "A"					

ATTACHMENT "A"

Form A- Completed Projects

Main Office: 79 Rocklyn Avenue, Lynbrook, New York 11563 (516) 256-5515 Fax(516) 256-5542
NYC Office: 230 Park Avenue, 3rd Floor, New York, NY 10169 (718) 499-4121 Fax (718) 965-3934
e-mail:info@InterphaseElec.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Lawrence Middle School** **Auditorium Improvement**
Work Performed:	Upgrades to Theatrical Lighting, Sound System & General Lighting
Agency/Owner	Lawrence UFSD
Proj. Location:	Lawrence Middle School 195 Broadway, Lawrence NY
Arch/Engineer:	Mark Design Studio Architecture, PC Michael Mark 516-827-0240
Contract Dollar Amt.	$407,317.00
Contract Change:	$418,985.00
Percent Complete:	100%
Surety Co.	RLI Insurance
Award Date	May 25, 2018
Completion Date:	June 30, 2020
Project Manager:	Craig Cammarata
Phone # Supervisor	516-295-7045

Contractor:	**Interphase Electric Corporation**
Name of Project:	**PS127**
Scope of Work:	Provide New Electrical Service, Feeders to Mechanical Equipment. Install new F/A, Security System, Lighting, Telecommunication System, CCTV System, Sound, Clock, Projectors & PA Systems and Lightning Protection Systems to New and Existing Buildings
Agency/Owner	NYC School Construction Authority
Project/Contract #	SCA18-025324-1 (C000015037)
Proj. Location:	7805 7th Ave., Brooklyn NY
Arch/Engineer:	Macrae Gibson Architects 212-294-2940
Contract Dollar Amt. Contract Change: Percent Complete:	$5,650,000.00 $5,914,413.00 100%
Surety Co.:	Alliant
Award Date: Start Date:	November 1, 2018 January 2019
Completion Date:	October 1, 2022
General Contractor:	The Morganti Group, Inc.
Project Supervisor:	Danillo Andrade dandrade@morganti.com
Phone # Supervisor	203-830-3345

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Brooklyn Navy Yard - Building 127**
Work Performed:	New Service and Feeder Distribution, New Generator, Lighting & Fire Alarm System
Agency/Owner	Brooklyn Navy Yard Dev. Corp
Proj. Location:	63 Flushing Ave., Brooklyn, NY
Arch/Engineer:	S9 Architect
Contract Dollar Amt.	$3,191,857.00
Contract Change:	$3,763,673.00
Percent Completed:	100%
Surety Co.:	RLI Insurance Co.
Award Date:	November 5, 2018
Start Date:	November 14, 2018
Completion Date:	August 31, 2020
Project Mgr.-	Rosario D'Urso Brooklyn Navy Yard Development Corp 929-337-1219
Project Mgr.	Barbara Carmosino Turner Construction 646-879-0573
Email Manager:	bcarmosino@tcco.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Riverbank State Park - Theater Upgrade** **Denny Farrell Park**
Work Performed:	Theater Upgrade New AV System, New Lighting System
Agency/Owner	NYS Department of Parks & Recreation
Project/Contract #	D005320
Proj. Location:	679 Riverside Drive, NY NY
Arch/Engineer:	W X Y Architecture 212-219-1953
Contract Dollar Amt. Current Contract Amt. Percent Completed:	$955,317.00 $1,086,747.00 100%
Surety Co.:	RLI Insurance
Award Date: Start Date:	February 1, 2018 April 12, 2018
Completion Date:	5/2019
Project Manager:	NYS Parks- Maxfield Schnaufer 212-866-3535 Maxfield.Schnaufer@parks.ny.gov
Const. Manager:	Hill International - John Swartzwelder JohnSwartzwelder@hillintl.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Renovate Vander Clute Hall for Student Union SUNY Maritime College**
Scope Of Work:	**Interior Fit Out to Campus Hall/Study Hall New Fire Alarm. New Lighting**
Agency/Owner	State University Construction Fund
Project/Contract #	211026-00
Proj. Location:	SUNY Maritime College, Throgs Neck, NY
Arch/Engineer:	JMZ Architects & Planners
Contract Dollar Amt. Current Contract Amt.	$1,660,000.00 $2,112,973.00
Percent Complete:	100%
Surety Co.	N/A
Award Date	July 1, 2021
Commencement Date:	October 2021
Completion Date:	October 2023
Construction Manager:	Gryphon Construction, Inc.
Project Manager:	Nidhi Beedu
Phone # Supervisor	732-253-7842

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 attachment "B"							



ATTACHMENT "B"

Form B- Current Projects

Main Office: 79 Rocklyn Avenue, Lynbrook, New York 11563 (516) 256-5515 Fax(516) 256-5542
NYC Office: 230 Park Avenue, 3rd Floor, New York, NY 10169 (718) 499-4121 Fax (718) 965-3934
e-mail:info@InterphaseElec.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**GSA Broadway Plaza Reconstruction and Roof Repair Project**
Scope Of Work:	Install New F/A, Install additional branch circuit wiring for new lighting and power. New wiring to feed 100 amp Electrical Snow Melt Sytem.
Agency/Owner	U.S. General Services Administration
GC/Construction Mgr.	Volmar Construction
Project/Contract #	47PC0319C0002
Proj. Location:	26 Federal Plaza, NY NY
Arch/Engineer:	Perkins Eastman
Original Contract Amt. Current contract Amt.	$1,743,010.00 $1,925,855.00
Surety Co.	RLI Surety
Award Date Commencement Date:	July 29, 2021 January 18, 2022
Percent Complete:	54%
Completion Date:	Est. 2024
Project Manager:	Hermant Shah hermant@volmar.com Krishna Prasad krishna@volmar.com
Phone # Supervisor	212-233-2360/917-682-4302

Contractor:	**Interphase Electric Corporation**
Name of Project:	**NYPD Erie Basin Tow Pound Electrical Restoration**
Scope Of Work:	New Service and Infrastructure including Conduit and Wiring. Install New Generator. Fire Alarm.Install New Lighting, New Generator and Branch Circuits.
Agency/Owner	Department of Design and Construction (DDC)
Project/Contract # PIN #	Sandelec-8 8502020PD0004C
Proj. Location:	700 Columbia Street, Brookyn, NY 11231
Arch/Engineer:	A&W Architects and Engineers, PC
Contract Dollar Amt.	$2,202,327.00
Percent Completed:	37%
Surety Co.	RLI Surety
Award Date Commencement Date:	April 16, 2021 January 24, 2022
Completion Date:	Est. May 2024
Project Manager:	Kevin Arscott
Email Supervisor	ArscottK@ddc.nyc.gov

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Brooklyn Navy Yard - Sprinkler & FA Upgrade**
Contract #:	**21-019-0023**
Scope of Work:	Furnish & Install New F/A System Control Panel, Furnish & Install new ARCS System devices Furnish & Install new Light fixtures, 120V power, Furnish & Install New heat trace system, distribution panels & exit signs
Agency/Owner	Brooklyn Navy Yard Dev. Corp
Proj. Location:	63 Flushing Ave., Brooklyn, NY Buildings 50 & 3, 5, 280
Arch/Engineer:	Velocity A&E Group
Contract Dollar Amt. Revised Contract Amt.	$5,768,970.00 $6,511,766.00
Percent Completed:	60%
Surety Co.:	RLI Insurance Co.
Award Date: Start Date:	February 1, 2022 May 2022
Anticipated Completion:	Est. October 2023
Project Exec.	Dikran Sepetjian Broadway Construction Group 212-837-4688
Email :	dsepetjian@broadwaycg.com 212-837-4688

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Riverbank Aquatics Locker Room Rehabilitation**
Scope of Work:	F&I Fire Alarm, Lighting,Service, Low voltage speakers.
Agency/Owner	NYS Parks, Recreation and Historic Preservation
Project/Contract #	D006052
Proj. Location:	679 Riverside Drive New York NY 10031
Architect:	WSP USA INC.
Contract Dollar Amt.	$716,304.00
Percent Completed:	14%
Surety Co.:	RLI Insurance Company
Start Date	May 2023
Completion Date:	February 2024
Project Manager:	LiRo Francis Stoddard stoddardf@liro.com
Phone # Supervisor	917-648-9744

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Gansevoort Peninsula Building**
Scope Of Work:	**Install New Lighting , Power, Panel Boards to New Maintenance, Operations & Concession Buildings**
Agency/Owner	Hudson River Park Trust
Project/Contract #	C5330 - Electrical
Proj. Location:	Gansevoort Peninsula Bldg. Hudson River Park, NY
Arch/Engineer:	James Corner Field Operations
Award Date Commencement Date:	December 27, 2021 February 2022
Contract Dollar Amt. Revised Contract Amt	$804,329.00 $874,722.00
Percent Complete:	98%
Surety Co.	RLI Insurance Company
Construction Manager:	Gilbane Building Company
Project Manager:	Corey Bedford
Phone #	718-490-0877 cb@invictuseng.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Bay Terrace Community Library Renovation**
Scope Of Work:	New Service, New Lighting, New Receptacles F/A, CCTV Installation, Teledata Communications
Agency/Owner	Queens Public Library
Project/Contract #	667009-00001
Proj. Location:	6 Penny Field Avenue, Bronx, NY
Arch/Engineer:	Applied Designs Initiative LLC
Contract Dollar Amt. Revised Contract Amt.	$700,000.00 $756,050.00
Percent Complete:	50%
Surety Co.	N/A
Contract Date:	March 1, 2022
Commencement Date:	July 2022
Completion Date:	Estimated December 2023
Construction Manager:	Gryphon Construction
Project Manager:	Sudhir Kittur
Phone # Supervisor	732-253-7842

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)
See attachment "C"					

ATTACHMENT "C"

Form C- Pending Projects

Main Office: 79 Rocklyn Avenue, Lynbrook, New York 11563 (516) 256-5515 Fax(516) 256-5542
NYC Office: 230 Park Avenue, 3rd Floor, New York, NY 10169 (718) 499-4121 Fax (718) 965-3934
e-mail:info@InterphaseElec.com

Contractor:	**Interphase Electric Corporation**
Name of Project:	**BKNY She Wolf Bakery**
Scope Of Work:	New Lighting, New FA, New Service
Agency/Owner	Brooklyn Navy Yard Development Corp
Project/Contract #	20220072
Proj. Location:	141 Flushing Avenue, Brooklyn NY
Arch/Engineer:	Spacesmith LLP
Contract Dollar Amt.	$875,000.00
Percent Complete:	0%
Surety Co.	N/A
Contract Date:	October 2023
Commencement Date:	December 2023
Completion Date:	June 2024
Construction Manager:	SJS Construction Company
Project Manager:	Rosario D'Urso
Phone # Supervisor	929-337-1219

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Red Hook Library**
Scope Of Work:	New Lighting, New Service, New FA, Telecom
Agency/Owner	Capital Planning and Facilities
Project/Contract #	207732
Proj. Location:	7 Wolcott Street, Brooklyn NY
Arch/Engineer:	Levenbetts
Contract Dollar Amt.	$1,240,951.00
Percent Complete:	0%
Surety Co.	N/A
Contract Date:	August 2023
Commencement Date:	January 2024
Completion Date:	January 2025
Construction Manager:	AWL
Project Manager:	Sabastian Pazdry
Phone # Supervisor	347-229-7414 spazdry@awlindustries.com

Prime Contractor:	**Interphase Electric Corporation**
Work Performed on Proj:	New Lighting, Fire Alarm and Sound & Security Systems
Name of Project:	**Museum City of New York**
Agency/Owner:	DDC
Project/Contract #:	2004000148-658
Proj. Location:	1220 Fifth Ave. New York, NY
Proj. Manager:	Hill International
Arch/Engineer:	Helpern Archt.
Completed Contract:	$3,463,860.00
Surety Co:	RLI Surety
Start Date:	8/12/2006
Completion Date:	09/15/2008
Name Agency/Owner:	Anil Ally anilally@hillintl.com
Phone # Supervisor:	347-255-2114
Coordinator MCNY	Henry Galindo hgalindo@mcny.org 917-861-5791

Prime Contractor:	**Interphase Electric Corporation**
Work Performed on Proj:	New Lighting & Power, Security & Sound System, Fire Alarm, Data & Comm. System, Theatrical Lighting & . Dimming Sytems. Installed 4,000 amp switchgear. Main Distribution Panels, 400, 200 & 100 amp subpanels, installed Con Ed feeders to property line boxes
Name of Project:	**Weeksville Heritage Center**
Agency/Owner:	NYC Dept. of Design and Construction
Project/Contract #:	20080041372
Proj. Location:	158 Buffalo Ave., Bklyn, NY
Proj. Manager:	Hill International
Arch/Engineer:	Caples and Jefferson
Contract Dollar Amt: Completed Contract Amt.	$4,327,000.00 $6,023,580.00
Surety Co:	RLI Surety
Start Date:	10/27/09
Completion Date:	06/06/14
Project Manager:	Amjad Dutt
Phone # Supervisor:	718-391-1194 Cell - 646-210-6276

Prime Contractor:	**Interphase Electric Corporation**
Work Performed on Proj:	New Lighting, Security and Sound System, New Fire Alarm, Generator
Name of Project:	**MCCarren Pool and Bath House**
Agency/Owner:	City of NY Parks and Recreation
Project/Contract #:	201000017454 - B058-208M
Proj. Location:	776 Lormier Street, Brooklyn
Arch/Engineer	Rogers Marvel
Awarded Contract Completed Contract	$4,373,337.00 $5,579,701.00
Surety Co:	RLI Surety
Start Date:	10/12/2009
Completion Date:	7/12/2013
Directors of Building:	Lorenzo Calabrese lorenzo.calabrese@parks.nyc.gov
Phone #:	347-386-2244

Contractor:	**Interphase Electric Corporation**
Name of Project:	**MTA Woodside Electronic Shop**
Work Performed:	Installation of new service feeders, new EDR room, replacement of sub panels and feeders in existing buiding. New building lighting and power
Agency/Owner	Metropolitan Transit Authority
Project/Contract #	C34843
Proj. Location:	33-61 54th Street, Woodside NY
Arch/Engineer:	Dept. of Capital Program Management MTA
Contract Dollar Amt. Contract Change: Percent Completed:	$2,500,000.00 $2,629,557.00 100%
Surety Co.:	RLI Insurance
Contract Date: Start Date:	June 4, 2018 June 20, 2018
Completion Date:	May 1, 2021
Project Manager:	Robert Pavlovich rpavlovich@awlindustries.com
Phone # Supervisor	718-388-2017

Contractor:	**Interphase Electric Corporation**
Name of Project:	**Jericho UFSD** **Capital Improvement Program Ph2**
Work Performed:	New Generator & ATS, New Fire Alarm, New PA, Clock System New Lighting, Theatrical Lighting, Sound Systems, New Electrical Panels
Agency/Owner	Jericho Union Free School District
Project/Contract #	28-05-15-03-0-003-040 HS/MS 28-05-15-03-0-005-016 Cantiague 28-05-15-03-0-014-013 Seaman
Proj. Location:	Jericho HS/MS - Jericho NY Cantiague and Seaman Elementary School
Arch/Engineer:	John A. Grillo Architect, P.C.
Contract Dollar Amt.	$4,185,400.00
Percent Complete:	100%
Surety Co.	RLI Insurance
Award Date	June 1, 2017
Completion Date:	August 15, 2018
Construction Manager	SCC Construction Managment Edgardo Barbosa eb@scc-cm.com
Phone # Supervisor:	631-954-8158
Jericho Theater Director:	Ms. Kati Behr kbehr@jerichoschools.org
Phone #:	516-203-3600 x3233
Jericho Representative: Phone #:	Mr. Michael Hahn mhahn@jerichoschools.org 516-203-3600 x 3233

Contractor:	**Interphase Electric Corporation**
Name of Project:	**North Meadow Recreation Center**
Scope of Work:	F& I Light Fixtures and controls, distribution system, Fire alarm
Agency/Owner	Central Park Conservancy
Project/Contract #	CP19009NMRC
Proj. Location:	151 97th Street Transverse Road Central Park, New York NY 10025
Architect:	Perkins Eastman Architect
Contract Dollar Amt:	$2,939,257.00
Percent Completed:	9%
Surety Co.:	RLI Insurance Company
Start Date	October 2023
Completion Date:	Est. October 2025
Project Manager:	C&L Contracting Corp Tony Massaro amassaro@clcont.com
Phone # Supervisor	516-326-4460

Apprenticeship Program

Apprenticeship Questions 1-3

Please be advised that, pursuant to the authority granted to the City under Labor Law Section 816-b:
The Department of Design and Construction hereby requires that the contractor awarded a contract as a result of this Invitation for Bids, and any of its subcontractors with subcontracts worth two million dollars or over, have, prior to entering into such contract or subcontract, 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 Commissioner of Labor.
In addition, the contractor and its subcontractors will be required to show that such apprenticeship program/s have successfully passed the two year Probation period following the initial registration date of such program/s with the New York State Department of Labor.
The failure to prove, upon request, that these requirements have been met shall result in the contract not being awarded to the contractor or the subcontract not being approved.
Please be further advised that, pursuant to Labor Law Section 220, the allowable ratio of apprentices to journeypersons in any craft classification shall not be greater than the ratio permitted to the contractor as to its workforce on any job under the registered apprenticeship program.

Please select yes if any of the following is true:

1. Does the bidder have any Apprenticeship Program agreement(s) appropriate for the type and scope of work to be performed? (Note: Participation may be by either direct sponsorship or through collective bargaining agreement(s).)

2. Has/have the bidder's Apprenticeship Program agreement(s) been registered with, and approved by the New York State Commissioner of Labor ("NYSDOL Commissioner")?

3. Has/have the bidder's Apprenticeship Program successfully passed the two-year Probation period following its initial registration with the New York State Department of Labor ("NYSDOL")?

Yes

Additional Information

Provide the contact information for such Apprenticeship Program(s) as well as information demonstrating that such Apprenticeship Program(s) have passed the two-year Probation period following its initial registration with the NYSDOL.

Where the bidder directly sponsors any such apprenticeship Program(s), the bidder shall provide the following:
o The trade classification(s) covered by such program(s), and the date(s) such program(s) was/were approved by the NYSDOL Commissioner; and/or
o A copy of a letter(s) from the NYSDOL, on NYSDOL's letterhead, executed by an official thereof, which verifies/verify the trade classification(s) covered by such program(s), and the date(s) such program(s) was/were approved by the NYSDOL Commissioner and the Active status of such program(s).

Where the bidder participates in any such Apprenticeship Program(s) through its membership in an employer organization(s) that directly sponsors such program(s) or where the employer association(s) participates in such program(s) through collective bargaining, the bidder shall provide the following:
o The contact information for the employer organization(s), and the apprenticeable trade(s) covered pursuant to the bidder's affiliation therewith, and the date such program(s) was/were approved by the NYSDOL Commissioner; or
o A letter(s) from such employer organization(s), on letterhead of such organization(s), executed by an officer, delegate or official thereof, which verifies/verify the trade classification(s) covered by such program(s) was/were approved by the NYSDOL Commissioner, and that the bidder is both a member in good standing of the identified employer organization and is subject to the provisions of the Apprenticeship Program agreement(s) sponsored thereby.

Where the bidder participates in any such Apprenticeship Programs through collective bargaining agreements, the bidder shall provide the following:
o The contact information for such collective bargaining entity(ies) and the apprenticeable trade(s) covered pursuant to the bidder's affiliation therewith;
o A letter(s) from such collective bargaining entity(ies), on letterhead of such entity(ies), executed by an officer,

delegate or official thereof, which verifies/verify the bidder’s status as a signatory/participant in good standing to such collective bargaining entity(ies) Apprenticeship Program Agreements.

Approved Apprenticeship.pdf



Translate

Department of Labor
(/)

List of Active Sponsors

LIST OF ACTIVE SPONSORS - UPDATED 7/6/2023

Search: interphase

Sponsor Name	Address	Regional Economic Development Council (REDC)	Trade	Approval Date	Status
Interphase Electric Corp.	79 Rocklyn Avenue, Lynbrook, NY 11563	Long Island	Electrician	12/08/2003	Active

Previous 1 Next

SPONSORS & PROGRAMS

All You Need To Know

FIND OPPORTUNITIES (/apprenticeship/sponsors-and-programs)

Department of Labor

ABOUT US

Our Mission & Services

Commissioner

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

Kathy Hochul, Governor
Roberta Reardon, Commissioner

Apprenticeship Training Central Office
New York State Department of Labor
W. Averell Harriman State Office Campus
Building 12, Room 459, Albany, NY 12240
Zakiyyah.Knox@labor.ny.gov
ATCO@labor.ny.gov

February 24, 2023

Dear Mr. Iaccarino:

I am writing in response to your email dated February 23, 2023, requesting verification of a NYS DOL approved apprenticeship program.

Our records indicate that Interphase Electric Corp. does have an approved Apprenticeship program with the State of New York.

Please be advised that our revised regulations Part 601.8(d) requires sponsors to submit lists of signatory contractors at time of program application (for new programs) and at time of program recertification (for existing programs). A list of NYSDOL Registered Apprenticeship Programs may be found at the following web address: https://dol.ny.gov/list-active-sponsors

Thank you,

Zakiyyah Knox

Apprenticeship Training Representative

Trade: Electrician
Sponsor: Interphase Electric Corp.
Date Registered: 12/08/2003
Current Status: Active

SAFETY QUESTIONNAIRE

The Bidder must include, with its bid, all information requested on this Safety Questionnaire. Failure to provide a completed and signed Safety Questionnaire at the time of bid opening may result in disqualification of the bid as non-responsive. This Safety Questionnaire will be reviewed as per Section V of the Safety Requirements for Construction Contracts, found in Volume 2 of the Contract.

1. Bidder Information:

Company Name: Interphase Electric Corp

DDC Project Number: PV669-NPC

Company Size: ☐ Ten (10) employees or less

☑ Greater than ten (10) employees

Company has previously worked for DDC: ☑ YES ☐ NO

2. Type(s) of Construction Work:

Identify the types of work that the Bidder has performed in the last three years, and the types of work that are part of this Contract.

TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction	☐	☐
Residential Building Construction	☐	☐
Nonresidential Building Construction	☐	☐
Heavy Construction, except building	☐	☐
Highway and Street Construction	☐	☐
Heavy Construction, except highways	☐	☐
Plumbing, Heating, HVAC	☐	☐
Painting and Paper Hanging	☐	☐
Electrical Work	☑	☑
Masonry, Stonework and Plastering	☐	☐
Carpentry and Floor Work	☐	☐
Roofing, Siding, and Sheet Metal	☐	☐
Concrete Work	☐	☐
Specialty Trade Contracting	☐	☐
Asbestos Abatement		
Other (specify) _____	☐	☐

3. Experience Modification Rate:

The Experience Modification Rate (EMR) is a rating generated by the National Council of Compensation Insurance (NCCI). This rating is used to determine the contractor's premium for worker's compensation insurance. The Bidder / Contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the Bidder cannot obtain its EMR, it must submit a written explanation as to why.

The Bidder must indicate its Intrastate and Interstate EMR for the past three years. [Note: For contractors with less than three years of experience, the EMR will be considered to be 1.00].

YEAR	INTRASTATE RATE	INTERSTATE RATE
2022	.81	N/A
2021	.81	
2020	.93	

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the Bidder / Contractor must attach, to this questionnaire, a written explanation for the rating and identify what corrective action was taken to correct the situation resulting in that rating.

4. OSHA Information:

☐ **YES** ☑ **NO** **Contractor has received a willful violation issued by OSHA or a New York City Department of Buildings (NYCDOB) construction-related violation within the last three years.**

☐ **YES** ☑ **NO** **Contractor has had an incident requiring OSHA notification within 8 hours (all work-related fatalities) or an incident requiring OSHA notification within 24 hours (work-related in-patient hospitalization, amputation and all loss of an eye).**

The OSHA Form 300 "Log of Work-Related Injuries and Illnesses" and OSHA Form 300A "Summary of Work-Related Injuries and Illnesses" must be submitted for the last three years for Contractors with more than ten employees.

The Bidder / Contractor must indicate the total number of hours worked by its employees, as reflected in payroll records for the past three (3) years.

The Bidder / Contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three (3) years. The Incident Rate is calculated in accordance with the formula set forth below. For each given year, the total number of incidents is the total number of non-fatal injuries and illnesses reported on the OSHA Form 300 and OSHA Form 300A. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty (50) weeks per year.

$$\text{Incident Rate} = \frac{\text{Total Number of Incidents X 200,000}}{\text{Total Number of Hours Worked by Employees}}$$

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2022	56,482	0
2021	59,323	0
2020	49,607	0

If the Bidder's / Contractor's Incident Rate for any of the past three years is one point higher than the Incident Rate for the type of construction it performs (listed below), the Bidder / Contractor must attach, to this questionnaire, a written explanation for the relatively high rate.

General Building Construction	8.5
Residential Building Construction	7.0
Nonresidential Building Construction	10.2
Heavy Construction, except building	8.7
Highway and Street Construction	9.7
Heavy Construction, except highways	8.3
Plumbing, Heating, HVAC	11.3
Painting and Paper Hanging	6.9
Electrical Work	9.5
Masonry, Stonework and Plastering	10.5
Carpentry and Floor Work	12.2
Roofing, Siding, and Sheet Metal	10.3
Concrete Work	8.6
Specialty Trade Contracting	8.6

5. Safety Performance on Previous DDC Project(s)

☐ YES ☑ NO Fatality or an incident requiring OSHA notification within 24 hours (work-related in-patient hospitalization, amputation and all loss of an eye) on DDC Project(s) within the last three (3) years.

DDC Project Number(s): _____, _____, _____

The Bidder hereby affirms that all the information provided in this Safety Questionnaire and all additional pages and/or attachments, if applicable, consist of accurate representations.

Date: 11/8/23 By: _____

(Signature of Bidder: Owner, Partner, Corporate Officer)

Title: Vice President

Department of Design and Construction

PROJECT ID: **PV669-NPC**

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

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

Nuyorican Poets Cafe Renovation Rebid

LOCATION:	**PV669-NPC**
BOROUGH:	**Manhattan, NY 10009**
CITY OF NEW YORK	
CONTRACT NO. 1	**GENERAL CONSTRUCTION WORK**
CONTRACT NO. 2	**PLUMBING WORK**
CONTRACT NO. 3	**HVAC + FIRE PROTECTION WORK**
CONTRACT NO.4	**ELECTRICAL WORK**

DCLA

Rice+Lipka Architects

Date: **August 4, 2023**

Department of Design and Construction

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

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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 its 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 oversite 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;

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[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 Polices 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 actuallyinserted 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 andProposal 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 bythe 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, impactdrills, 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 anddesign 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**, orhis/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 rightto 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 withthe **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; NOTICESAND 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 AdditionalInsureds, 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 anyappropriate 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 orcontributing 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 Methodin 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 variousoperations 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, inthe 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 delayin the performance of this **Contrac**t 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 neitherknown 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, hasnot 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 extendsthe 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 ofdelay 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 multipleof 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 andno 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 Insuredand 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 ofa 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 toreal 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 todo 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 applicableto 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** tothe 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., asreferred 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** byauthorizing 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 expirationof 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 inthe 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 toa 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 forthat 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) x (HP rating) x (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) x (HP rating) x (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** inthe 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 ATIME & 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 withrespect 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 resolutionprocedure.

CHAPTER VII: POWERS OF THE RESIDENT ENGINEER, THE ENGINEER ORARCHITECT 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 bythe **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 issuean **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 outof 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 withthe

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 time[2]. 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 PSLL 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 PSLL. The **Contractor** acknowledges that it is responsible for compliance with the PSLL notwithstanding any inconsistent language contained herein.

35.5.2 Pursuant to the PSLL 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 PSLL ("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 PSLL 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 providerhas 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 PSLL. 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 PSLL 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 Polices 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 termsof the **ContrSact** and this Article 35.6 (l) 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 partsof 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 amonthly 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 qualifiedand 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 repairof 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 applicantfor 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, ratesof 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 AdministrativeCode, 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 orshe 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 acondition 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 usedif 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 performanceof 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 priceor 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 submitto 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 44and 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 intendedfor 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; orif

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 performthe **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 assertedwithin 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 forthe 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 NewYork 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 interestin, 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 inassessing 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 tothe 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 theperson 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 thathas 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 tothe 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 ina

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 willbe 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 ofthe 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 contraction 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 toand 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 asses, 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 actionefforts 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 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 strictaccordance 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 reasonablyhave 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 Pages1-2) 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.

DocuSign Envelope ID: DBD991D9-ABCF-4EC2-B4E6-A9F42758F674

CONTRACT SIGNATURE PAGE

This Contract is entered by and between the City of New York ("City"), acting by and through the **DEPARTMENT OF DESIGN AND CONSTRUCTION**, and **INTERPHASE ELECTRIC CORPORATION** ("Contractor").

This Contract consists of this contract signature page as well as the following documents ("Contract Documents") which are located in the Documents tab of the PASSPort record titled **85024B0006-PV669-NPC (Electrical) Rebid**.

1. (Question answer) - Bid Bond.pdf - Jan 24 2024 6:42PM
2. (Question answer) - Qualificaiton Form.pdf - Jan 24 2024 6:43PM
3. Brokers Certification - Jan 29 2024 1:18PM
4. Disability Insurance - Jan 29 2024 1:15PM
5. General Liability - Jan 29 2024 1:20PM
6. NOTICE TO BIDDERS - COVID19_R5_Addendum5 - Jan 22 2024 3:01PM
7. Proposal/Bid - Jan 22 2024 3:01PM
8. PV669-NPC_(Electrical)_Bidder #2_Interphase Electrical Corp._Detailed Bid Breakdown - Jan 24 2024 6:33PM
9. PV669-NPC_Addendum1 - Jan 22 2024 3:01PM
10. PV669-NPC_Addendum2 - Jan 22 2024 3:01PM
11. PV669-NPC_Addendum3 - Jan 22 2024 3:01PM
12. PV669-NPC_Addendum4 - Jan 22 2024 3:01PM
13. PV669-NPC_Addendum5 - Jan 22 2024 3:01PM
14. PV669-NPC_Appendix - Jan 22 2024 3:01PM
15. PV669-NPC_Bid Drawings_Part1 - Jan 22 2024 3:01PM
16. PV669-NPC_Bid Drawings_Part2_Addendum1 - Jan 22 2024 3:01PM
17. PV669-NPC_Planholder List_Addendum1 - Jan 22 2024 3:01PM
18. PV669-NPC_Previous Addenda PBQ - Jan 22 2024 3:01PM
19. PV669-NPC_Volume2 - Jan 22 2024 3:01PM
20. PV669-NPC_Volume3_Addendum4 - Jan 22 2024 3:01PM
21. RFx Document - Jan 22 2024 3:01PM
22. Security/Bond - Jan 29 2024 1:22PM
23. Volume 1 - Jan 22 2024 3:01PM
24. Woker's Compensation - Jan 29 2024 1:16PM

DocuSign Envelope ID: DBD991D9-ABCF-4EC2-B4E6-A9F42758F674

The above order does not represent an order of precedence. The Contract shall be governed by the order of precedence, if any, in the Contract Documents or by ordinary contract principles if no such order of precedence exists.

Each party is signing this Contract electronically on the date stated in that party's electronic signature.

The City of New York
By: **DEPARTMENT OF DESIGN AND CONSTRUCTION**

DocuSigned by:
ERIC MACFARLANE
1A87ABA0188B41C...
(Signature)

Name: ERIC MACFARLANE

Title: First Deputy Commissioner

Date: 2/7/2024 | 11:53:05 PST

Contractor
By: **INTERPHASE ELECTRIC CORPORATION**

DocuSigned by:
Eric Vitale
E8862270BC594C3...
(Signature)

Name: Eric Vitale

Title: Vice President

Date: 2/7/2024 | 10:10:11 PST

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, INTERPHASE ELECTRIC CORP.

79 ROCKLYN AVENUE, LYNBROOK, NY 11563

hereinafter referred to as the "Principal,"
and, RLI INSURANCE COMPANY

9025 NORTH LINDBERGH DRIVE, PEORIA, IL 61615

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 THREE MILLION EIGHTY SIX THOUSAND FOUR HUNDRED SIXTEEN AND

00/100 DOLLARS

($ 3,086,416.00) Dollars, lawful money of the United States for the payment of whichsaid 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

NUYORICAN POETS CAFE RENOVATION REBID - CONTRACT 4 ELECTRICAL PROJECT # PV669-NPC

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth infull;

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 nulland void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the Citythat the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost tocomplete 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 thecost of completion plus any applicable damages and costs under option (1) above, or to commence anddiligently 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 timeas 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 costof 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 byany extension of time, modification, omission, addition, or change in or to the said Contract or the Workto 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 doneand 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 forthe completion of the Contract as if such sums had not been paid to the Principal, but shall not provide abasis 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.

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

23RD day of JANUARY, 20 24 .(Seal)

INTERPHASE ELECTRIC CORP. (L.S.)
Principal

(Seal)

By: Eric Vitale, Vice President

Surety
RLI INSURANCE COMPANY

By: DAVID A. GOLDSTEIN, ATTORNEY-IN-FACT
(Seal) Surety

By: .
. .
(Seal) Surety

By: .
. .
(Seal) Surety

By: .
. .
(Seal) Surety

By: .

Bond Premium Rate SLIDING SCALE .

Bond Premium Cost $32,084 .

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 aduly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the numberof counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of New York County of Nassau ss:

On this 26th day of January, 2024 before me personally came Eric Vitale,
to me known, who, being by me duly sworn did depose and say that he/she residesat
18 Melton Dr. W. Rockville Ctr. NY 11570; that he/she is the Vice President
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.

JENITA FERNANDES
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FE0014429
Qualified in Nassau County
Commission Expires October 10, 2027

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 dispose and say that he/she residesat _____
_____; 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 ofsaid 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 residesat _____
_____, 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 OF SURETY

State of New York

County of Suffolk ss:

On this 23rd day of January 2024 before me personally appeared

David A. Goldstein to me known, who, being by me duly sworn, did depose and say
that he resides at Merrick, New York
that he is the Attorney-in-Fact of RLI Insurance Company

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 hereto by like order.

Jennifer Spadaro

JENNIFER SPADARO
Notary Public, State of New York
Reg. No. 01SP5017514
Qualified in Suffolk County
Commission Expires September 7, 2025

POWER OF ATTORNEY

Bond No: RCB0038571

RLI Insurance Company
Contractors Bonding and Insurance Company

9025 N. Lindbergh Dr. Peoria, IL 61615
Phone: 800-645-2402

Know All Men by These Presents:

That this Power of Attorney is not valid or in effect unless attached to the bond which it authorizes executed, but may be detached by the approving officer if desired.

That **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, each an Illinois corporation, (separately and together, the "Company") do hereby make, constitute and appoint:

Glenn Glubiak, David A. Goldstein, Jennifer Spadaro, Penny Rocco, jointly or severally

in the City of Melville, State of New York its true and lawful Agent(s) and Attorney(s) in Fact, with full power and authority hereby conferred, to sign, execute, acknowledge and deliver for and on its behalf as Surety, in general, any and all bonds and undertakings in an amount not to exceed **Twenty Five Million** Dollars (**$25,000,000.00**) for any single obligation.

The acknowledgment and execution of such bond by the said Attorney in Fact shall be as binding upon the Company as if such bond had been executed and acknowledged by the regularly elected officers of the Company.

RLI Insurance Company and/or **Contractors Bonding and Insurance Company**, as applicable, have each further certified that the following is a true and exact copy of a Resolution adopted by the Board of Directors of each such corporation, and is now in force, to-wit:

> "All bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, any Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or Agents who shall have authority to issue bonds, policies or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile."

IN WITNESS WHEREOF, the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, as applicable, have caused these presents to be executed by its respective Vice President with its corporate seal affixed this 10th day of June, 2020.

CONTRACTORS BONDING AND INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI Insurance Company
Contractors Bonding and Insurance Company

By: _____
Barton W. Davis — Vice President

State of Illinois
County of Peoria } SS

On this 10th day of June, 2020, before me, a Notary Public, personally appeared Barton W. Davis, who being by me duly sworn, acknowledged that he signed the above Power of Attorney as the aforesaid officer of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** and acknowledged said instrument to be the voluntary act and deed of said corporation.

By: _____
Catherine D. Glover — Notary Public

CATHERINE D. GLOVER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
March 24, 2024

CERTIFICATE

I, the undersigned officer of **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, do hereby certify that the attached Power of Attorney is in full force and effect and is irrevocable; and furthermore, that the Resolution of the Company as set forth in the Power of Attorney, is now in force. In testimony whereof, I have hereunto set my hand and the seal of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** this 23rd day of January, 2024.

RLI Insurance Company
Contractors Bonding and Insurance Company

By: _____
Jeffrey D. Fick — Corporate Secretary

RLI®
SURETY

P.O. BOX 3967 PEORIA, IL 61612-3967
P: (800)645-2402 E: asksurety@rlicorp.com
RLISURETY.COM

RLI Insurance Company

December 31, 2022

Admitted Assets

Investments:	
Fixed maturities	$ 1,343,631,923
Equity securities	1,268,806,758
Short-term investments	3,054,500
Real estate	27,014,108
Properties held to produce income	0
Cash and cash equivalents	57,699,481
Other invested assets	53,001,785
Receivables for securities	203,933
Agents' balances	88,924,498
Investment income due and accrued	10,365,084
Funds held	0
Reinsurance recoverable on paid losses	10,825,931
Federal income taxes receivable	1,430,379
Net deferred tax asset	11,010,858
Guarantee funds receivable or on deposit	0
Electronic data processing equipment, net of depreciation	755,308
Receivable from affiliates	0
Other admitted assets	39,343,761
Total Admitted Assets	$ 2,916,068,307

Liabilities and Surplus

Liabilities:	
Reserve for unpaid losses and loss adjustment expenses	$ 830,658,551
Unearned premiums	354,155,024
Accrued expenses	97,292,026
Funds held	422,374
Advance premiums	19,971,481
Amounts withheld	84,822,062
Remittances and items not allocated	1,448,394
Dividends declared and unpaid	44,327
Ceded reinsurance premium payable	28,148,458
Payable for securities	2,248,339
Statutory penalties	785,200
Current federal & foreign income taxes	0
Net deferred tax liability	0
Borrowed money and accrued interest	50,036,167
Drafts outstanding	0
Payable to affiliate	33,879,630
Other liabilities	4,231,114
Total Liabilities	$ 1,508,143,147
Surplus:	
Common stock	$ 10,000,375
Additional paid-in capital	242,451,084
Unassigned surplus	1,155,473,701
Total Surplus	$ 1,407,925,160
Total Liabilities and Surplus	$ 2,916,068,307

State of Illinois }
County of Peoria }

*The undersigned, being duly sworn, says: That he is the President of **RLI Insurance Company**; that said Company is a corporation duly organized, in the State of Illinois, and licensed and engaged in business in the State of* New York *and has duly complied with all the requirements of the laws of said State applicable of 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 approved July 1947, 6U.S.C sec. 6-13; and that to the best of his knowledge and belief the above statement is a full, true, and correct statement of the financial condition of the said Company on the 31st day of December 2022.*

Attest:

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

{ Corporate Seal Affixed }

Craig Kliethermes — President

Olga S. Happel — Assistant Secretary

Sworn to before me this 10th day of March, 2023.

CATHERINE D. GEIGER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
December 05, 2026

{ Notarial Seal Affixed }

Catherine D. Geiger — *Notary Public, State of Illinois*

M0058323_Portal

PERFORMANCE BOND #2

Performance Bond #2 (4 pages): Use if the total contract price is more than $5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2KNOW 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 infull;

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 Cityfrom 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 orwhich the said City of New York may be called upon to pay any person or corporation by reason of anydamages arising or growing out of the Principal's default of the Contract, then this obligation shall be nulland void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the Citythat 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 theContract, 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 thereoffrom 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 byany 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.

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 aduly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the numberof 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 residesat __
_____ ; that he/she is the _____
of the corporation described in and which executed the foregoing instrument; that he/she signed his/her name to theforegoing 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 residesat_____
_____; 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 residesat_____
_____, 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.

Bond No. RCB0038571

PAYMENT BOND

Use for any contract for which a Payment Bond is required.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, INTERPHASE ELECTRIC CORP.

79 ROCKLYN AVENUE, LYNBROOK, NY 11563

hereinafter referred to as the "Principal", and RLI INSURANCE COMPANY

9025 NORTH LINDBERGH DRIVE, PEORIA, IL 61615

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

THREE MILLION EIGHTY SIX THOUSAND FOUR HUNDRED SIXTEEN AND 00/100 DOLLARS

($3,086,416.00) 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

NUYORICAN POETS CAFE RENOVATION REBID-CONTRACT 4 ELECTRICAL PROJECT # PV669-NPC

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

(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 infull 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 rightof the City to require a bond containing the foregoing provisions, and they do hereby further expressly waiveany 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 place 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.

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their handsand 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 23RD day of JANUARY, 2024.

(Seal) INTERPHASE ELECTRIC CORP. (L.S.)Principal

By: Eric Vitale

Eric Vitale, Vice President

(Seal) RLI INSURANCE COMPANY Surety

By:

DAVID A. GOLDSTEIN, 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 aduly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the numberof counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Nassau ss:

On this 26th day of January, 2024, before me personally came Eric Vitale to me known, who, being by me duly sworn did depose and say that he resides at 18 Melton Dr. W Rockville Center, NY - 11570 that he is the Vice 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.

Notary Public or Commissioner of Deeds

JENITA FERNANDES
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FE0014429
Qualified in Nassau County
Commission Expires October 10, 2027

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 bondis 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 OF SURETY

State of New York

County of Suffolk ss:

On this 23rd day of January 2024 before me personally appeared

David A. Goldstein to me known, who, being by me duly sworn, did depose and say
that he resides at Merrick, New York
that he is the Attorney-in-Fact of RLI Insurance Company

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 hereto by like order.

Jennifer Spadaro

JENNIFER SPADARO
Notary Public, State of New York
Reg. No. 01SP5017514
Qualified in Suffolk County
Commission Expires September 7, 2025

POWER OF ATTORNEY

Bond No: RCB0038571

RLI Insurance Company
Contractors Bonding and Insurance Company

9025 N. Lindbergh Dr. Peoria, IL 61615
Phone: 800-645-2402

Know All Men by These Presents:

That this Power of Attorney is not valid or in effect unless attached to the bond which it authorizes executed, but may be detached by the approving officer if desired.

That **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, each an Illinois corporation, (separately and together, the "Company") do hereby make, constitute and appoint:

Glenn Glubiak, David A. Goldstein, Jennifer Spadaro, Penny Rocco, jointly or severally

in the City of Melville, State of New York its true and lawful Agent(s) and Attorney(s) in Fact, with full power and authority hereby conferred, to sign, execute, acknowledge and deliver for and on its behalf as Surety, in general, any and all bonds and undertakings in an amount not to exceed **Twenty Five Million** Dollars (**$25,000,000.00**) for any single obligation.

The acknowledgment and execution of such bond by the said Attorney in Fact shall be as binding upon the Company as if such bond had been executed and acknowledged by the regularly elected officers of the Company.

RLI Insurance Company and/or **Contractors Bonding and Insurance Company**, as applicable, have each further certified that the following is a true and exact copy of a Resolution adopted by the Board of Directors of each such corporation, and is now in force, to-wit:

> "All bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, any Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or Agents who shall have authority to issue bonds, policies or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile."

IN WITNESS WHEREOF, the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, as applicable, have caused these presents to be executed by its respective Vice President with its corporate seal affixed this 10th day of June, 2020.

CONTRACTORS BONDING AND INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

RLI Insurance Company
Contractors Bonding and Insurance Company

By: B. W. D.
Barton W. Davis — Vice President

State of Illinois
County of Peoria } SS

On this 10th day of June, 2020, before me, a Notary Public, personally appeared Barton W. Davis, who being by me duly sworn, acknowledged that he signed the above Power of Attorney as the aforesaid officer of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** and acknowledged said instrument to be the voluntary act and deed of said corporation.

By: Catherine D. Glover
Catherine D. Glover — Notary Public

CATHERINE D. GLOVER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
March 24, 2024

CERTIFICATE

I, the undersigned officer of **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company**, do hereby certify that the attached Power of Attorney is in full force and effect and is irrevocable; and furthermore, that the Resolution of the Company as set forth in the Power of Attorney, is now in force. In testimony whereof, I have hereunto set my hand and the seal of the **RLI Insurance Company** and/or **Contractors Bonding and Insurance Company** this 23rd day of January, 2024.

RLI Insurance Company
Contractors Bonding and Insurance Company

By: Jeffrey D Fick
Jeffrey D Fick — Corporate Secretary

RLI®
SURETY

P.O. BOX 3967 PEORIA, IL 61612-3967
P: (800)645-2402 E: asksurety@rlicorp.com
RLISURETY.COM

RLI Insurance Company

December 31, 2022

Admitted Assets

Investments:	
Fixed maturities	$ 1,343,631,923
Equity securities	1,268,806,758
Short-term investments	3,054,500
Real estate	27,014,108
Properties held to produce income	0
Cash and cash equivalents	57,699,481
Other invested assets	53,001,785
Receivables for securities	203,933
Agents' balances	88,924,498
Investment income due and accrued	10,365,084
Funds held	0
Reinsurance recoverable on paid losses	10,825,931
Federal income taxes receivable	1,430,379
Net deferred tax asset	11,010,858
Guarantee funds receivable or on deposit	0
Electronic data processing equipment, net of depreciation	755,308
Receivable from affiliates	0
Other admitted assets	39,343,761
Total Admitted Assets	$ 2,916,068,307

Liabilities and Surplus

Liabilities:	
Reserve for unpaid losses and loss adjustment expenses	$ 830,658,551
Unearned premiums	354,155,024
Accrued expenses	97,292,026
Funds held	422,374
Advance premiums	19,971,481
Amounts withheld	84,822,062
Remittances and items not allocated	1,448,394
Dividends declared and unpaid	44,327
Ceded reinsurance premium payable	28,148,458
Payable for securities	2,248,339
Statutory penalties	785,200
Current federal & foreign income taxes	0
Net deferred tax liability	0
Borrowed money and accrued interest	50,036,167
Drafts outstanding	0
Payable to affiliate	33,879,630
Other liabilities	4,231,114
Total Liabilities	$ 1,508,143,147
Surplus:	
Common stock	$ 10,000,375
Additional paid-in capital	242,451,084
Unassigned surplus	1,155,473,701
Total Surplus	$ 1,407,925,160
Total Liabilities and Surplus	$ 2,916,068,307

State of Illinois
County of Peoria }

*The undersigned, being duly sworn, says: That he is the President of **RLI Insurance Company**; that said Company is a corporation duly organized, in the State of Illinois, and licensed and engaged in business in the State of* New York *and has duly complied with all the requirements of the laws of said State applicable of 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 approved July 1947, 6U.S.C sec. 6-13; and that to the best of his knowledge and belief the above statement is a full, true, and correct statement of the financial condition of the said Company on the 31st day of December 2022.*

Attest:

RLI INSURANCE COMPANY CORPORATE SEAL ILLINOIS

{ Corporate Seal Affixed }

Craig Kliethermes — President

Olga S. Happel — Assistant Secretary

Sworn to before me this 10th day of March, 2023.

NOTARY PUBLIC STATE OF ILLINOIS
CATHERINE D. GEIGER
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
December 05, 2026

{ Notarial Seal Affixed }

Catherine D. Geiger — *Notary Public, State of Illinois*

M0058323_Portal

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
01/23/2024

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	CONTACT NAME: Margherita Walkowiak	
AssuredPartners Northeast, LLC. 100 Baylis Road Suite 300 Melville NY 11747	PHONE (A/C, No, Ext): (631) 465-4000	FAX (A/C, No):
	E-MAIL ADDRESS: margherita.walkowiak@assuredpartners.com	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Stillwater Property & Casualty Insurance Co.	16578
INSURER B : ShelterPoint Life Insurance	81434
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Interphase Electric Corp
79 Rocklyn Ave
Lynbrook NY 11563

COVERAGES **CERTIFICATE NUMBER:** CL2382814327 **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	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR [X] Contractual Liability GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:			GLGR9690-00	08/29/2023	08/29/2024	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG [ ]	$ 2,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 4,000,000 $ 4,000,000 $
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY			BAGR9690-00	08/29/2023	08/29/2024	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) [ ]	$ 1,000,000 $ $ $ $
A	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ 10,000			XSGR9690-00	08/29/2023	08/29/2024	EACH OCCURRENCE AGGREGATE [ ]	$ 5,000,000 $ 5,000,000 $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					[ ] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

The following are included as Additional Insureds on a primary and non-contributory basis with respects to General Liability including ongoing & completed operations, Auto Liability and Umbrella Liability as required by written contract. City of New York, including its officials and employees and Nuyorican Poets Cafe.
A waiver of subrogation applies in favor of Additional Insureds as required by written contract.

CERTIFICATE HOLDER

New York City Department of Design and Construction
30-30 Thomson Avenue
Long Island City NY 11101

CANCELLATION

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



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NYSIF
New York State Insurance Fund

PO Box 66699, Albany, NY 12206
| nysif.com

CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

^^^^^^ 112475482
HAMOND SAFETY MANAGEMENT LLC
6800 JERICHO TURNPIKE
SUITE 105W
SYOSSET NY 11791

SCAN TO VALIDATE
AND SUBSCRIBE

POLICYHOLDER	CERTIFICATE HOLDER
INTERPHASE ELECTRIC CORP 79 ROCKLYN AVE LYNBROOK NY 11563	NEW YORK CITYDEPARTMENT OF DESIGN & CONSTRUCTION 30-30 THOMSON AVENUE LONG ISLAND CITY NY 11101

POLICY NUMBER	CERTIFICATE NUMBER	POLICY PERIOD	DATE
G1481 332-3	170146	01/01/2024 TO 01/01/2025	1/23/2024

THIS IS TO CERTIFY THAT THE POLICYHOLDER NAMED ABOVE IS INSURED WITH THE NEW YORK STATE INSURANCE FUND UNDER POLICY NO. 1481 332-3, COVERING THE ENTIRE OBLIGATION OF THIS POLICYHOLDER FOR WORKERS' COMPENSATION UNDER THE NEW YORK WORKERS' COMPENSATION LAW WITH RESPECT TO ALL OPERATIONS IN THE STATE OF NEW YORK, EXCEPT AS INDICATED BELOW, AND, WITH RESPECT TO OPERATIONS OUTSIDE OF NEW YORK, TO THE POLICYHOLDER'S REGULAR NEW YORK STATE EMPLOYEES ONLY.

IF YOU WISH TO RECEIVE NOTIFICATIONS REGARDING SAID POLICY, INCLUDING ANY NOTIFICATION OF CANCELLATIONS, OR TO VALIDATE THIS CERTIFICATE, VISIT OUR WEBSITE AT HTTPS://WWW.NYSIF.COM/CERT/CERTVAL.ASP. THE NEW YORK STATE INSURANCE FUND IS NOT LIABLE IN THE EVENT OF FAILURE TO GIVE SUCH NOTIFICATIONS.

THIS CERTIFICATE DOES NOT APPLY TO THOSE JOB SITES WHICH ARE COVERED BY OTHER INSURANCE AND ARE SPECIFICALLY EXCLUDED BY ENDORSEMENT.

THE POLICY INCLUDES A WAIVER OF SUBROGATION ENDORSEMENT UNDER WHICH NYSIF AGREES TO WAIVE ITS RIGHT OF SUBROGATION TO BRING AN ACTION AGAINST THE CERTIFICATE HOLDER TO RECOVER AMOUNTS WE PAID IN WORKERS' COMPENSATION AND/OR MEDICAL BENEFITS TO OR ON BEHALF OF AN EMPLOYEE OF OUR INSURED IN THE EVENT THAT, PRIOR TO THE DATE OF THE ACCIDENT, THE CERTIFICATE HOLDER HAS ENTERED INTO A WRITTEN CONTRACT WITH OUR INSURED THAT REQUIRES THAT SUCH RIGHT OF SUBROGATION BE WAIVED.

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS NOR INSURANCE COVERAGE UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICY.

NEW YORK STATE INSURANCE FUND

DIRECTOR, INSURANCE FUND UNDERWRITING

VALIDATION NUMBER: 807798687

U-26.3

NEW YORK STATE | Workers' Compensation Board

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)
INTERPHASE ELECTRIC CORP.
79 ROCKLYN AVENUE
LYNBROOK, NY 11563

Work Location of Insured *(Only required if coverage is specifically limited to certain locations in New York State, i.e., Wrap-Up Policy)*

1b. Business Telephone Number of Insured
516-256-5515

1c. Federal Employer Identification Number of Insured or Social Security Number
112475482

2. Name and Address of Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)

New York City Department of Design and Construction
30-30 Thomson Avenue
Long Island City, NY 11101

3a. Name of Insurance Carrier
ShelterPoint Life Insurance Company

3b. Policy Number of Entity Listed in Box "1a"
DBL421786

3c. Policy effective period
01/01/2024 to 12/31/2024

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 1/24/2024 By _____
(Signature of insurance carrier's authorized representative or NYS Licensed Insurance Agent of that insurance carrier)

Telephone Number 516-829-8100 Name and Title Richard White, Chief Executive Officer

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.***

Additional Instructions for Form DB-120.1

By signing this form, the insurance carrier identified in Box 3 on this form is certifying that it is insuring the business referenced in Box 1a for disability and/or Paid Family Leave benefits under the NYS Disability and Paid Family Leave Benefits Law. The insurance carrier or its licensed agent will send this Certificate of Insurance Coverage (Certificate) to the entity listed as the certificate holder in Box 2.

The insurance carrier must notify the above certificate holder and the Workers' Compensation Board within 10 days IF a policy is cancelled due to nonpayment of premiums or within 30 days IF there are reasons other than nonpayment of premiums that cancel the policy or eliminate the insured from coverage indicated on this Certificate. (These notices may be sent by regular mail.) Otherwise, this Certificate is valid for one year after this form is approved by the insurance carrier or its licensed agent, or until the policy expiration date listed in Box 3c, whichever is earlier.

This Certificate is issued as a matter of information only and confers no rights upon the certificate holder. This Certificate does not amend, extend or alter the coverage afforded by the policy listed, nor does it confer any rights or responsibilities beyond those contained in the referenced policy.

This Certificate may be used as evidence of a NYS disability and/or Paid Family Leave benefits contract of insurance only while the underlying policy is in effect.

Please Note: Upon the cancellation of the disability and/or Paid Family Leave benefits policy indicated on this form, if the business continues to be named on a permit, license or contract issued by a certificate holder, the business must provide that certificate holder with a new Certificate of Insurance Coverage for NYS disability and/or Paid Family Leave Benefits or other authorized proof that the business is complying with the mandatory coverage requirements of the NYS Disability and Paid Family Leave Benefits Law.

NYS DISABILITY AND PAID FAMILY LEAVE BENEFITS LAW

§220. Subd. 8

(a) The head of a state or municipal department, board, commission or office authorized or required by law to issue any permit for or in connection with any work involving the employment of employees in employment as defined in this article, and not withstanding any general or special statute requiring or authorizing the issue of such permits, shall not issue such permit unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that the payment of disability benefits and after January first, two thousand and twenty-one, the payment of family leave benefits for all employees has been secured as provided by this article. Nothing herein, however, shall be construed as creating any liability on the part of such state or municipal department, board, commission or office to pay any disability benefits to any such employee if so employed.

(b) The head of a state or municipal department, board, commission or office authorized or required by law to enter into any contract for or in connection with any work involving the employment of employees in employment as defined in this article and notwithstanding any general or special statute requiring or authorizing any such contract, shall not enter into any such contract unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that the payment of disability benefits and after January first, two thousand eighteen, the payment of family leave benefits for all employees has been secured as provided by this article.

Print Form

CITY OF NEW YORK

CERTIFICATION BY INSURANCE AGENT OR BROKER

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.

AssuredPartners Northeast, LLC.

[Name of broker or agent (typewritten)]

100 Baylis Road, Suite 300, Melville, NY 11747

[Address of broker or agent (typewritten)]

philip.colletta@assuredpartners.com

[Email address of broker or agent (typewritten)]

(631) 465-4000 / (631) 465-4005

Phone Number / Fax Number of broker or agenct (typewritten)]

[Signature of authorized officer of broker]

Philip Colletta, President

[Name and title of authorized official, broker or agent (typewritten)]

Elizabeth Blythe Signorile
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01SI6279147
Qualified in Suffolk County
Commission Expires April 8, 2025

State of New York)
)ss.:
County of Suffolk)

Sworn to before me this

23 day of January, 20 24

NOTARY PUBLIC FOR THE STATE OF New York

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

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

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ASBESTOS HANDLER
SEE HAZARDOUS MATERIAL HANDLER

BLASTER

Blaster

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $57.71
Supplemental Benefit Rate per Hour: $52.23

Blaster - Hydraulic Trac Drill

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $51.85
Supplemental Benefit Rate per Hour: $52.23

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $51.02
Supplemental Benefit Rate per Hour: $52.23

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.50
Supplemental Benefit Rate per Hour: $52.23

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $22.25
Supplemental Benefit Rate per Hour: $52.23

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $65.88
Supplemental Benefit Rate per Hour: $48.47
Supplemental Note: For time and one half overtime - $72.13 For double overtime - $95.79

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $64.23
Supplemental Benefit Rate per Hour: $31.75

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $55.05
Supplemental Benefit Rate per Hour: $47.88

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 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $59.16
Supplemental Benefit Rate per Hour: $55.31

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.

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS
(Excludes Engineered Structures and Building Foundations)

Carpenter High Rise A

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $51.48
Supplemental Benefit Rate per Hour: $44.74

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $40.89
Supplemental Benefit Rate per Hour: $18.05

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

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.50
Supplemental Benefit Rate per Hour: $48.45

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.

(Carpenters District Council)

CARPENTER - WOOD WATER STORAGE TANK

Tank Mechanic

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $37.13
Supplemental Benefit Rate per Hour: $24.18

Tank Helper

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $29.23
Supplemental Benefit Rate per Hour: $24.18

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $47.28
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $36.80
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.77
Supplemental Benefit Rate per Hour: $34.01
Supplemental Note: Supplemental benefit time and one half rate: $61.47; 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

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$43.88**
Supplemental Benefit Rate per Hour: **$31.35**

Core Driller Helper

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$34.47**
Supplemental Benefit Rate per Hour: **$31.35**

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$31.02**
Supplemental Benefit Rate per Hour: **$31.35**

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$27.58**
Supplemental Benefit Rate per Hour: **$31.35**

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$24.13**
Supplemental Benefit Rate per Hour: **$31.35**

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $58.90
Supplemental Benefit Rate per Hour: $58.37

Derrick Person & Rigger - Site Work

Assists the Stone Mason-Setter in the setting of stone and paving stone.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.49
Supplemental Benefit Rate per Hour: $46.47

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.

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $74.03
Supplemental Benefit Rate per Hour: $55.31

Diver Tender (Marine)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.57
Supplemental Benefit Rate per Hour: $55.31

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $59.16
Supplemental Benefit Rate per Hour: $55.31

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.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Dump Truck

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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
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
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

Shift Rates
Off shift work commencing between 6:00 P.M. and 5:00 A.M. shall work eight and one half (8 1/2) hours allowing for one half hour for lunch

Driver Redi-Mix (Sand & Gravel)

Effective Period: 7/1/2023 - 6/30/2024
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).
Martin Luther King Jr. Day
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
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
New Year's Day
Martin Luther King Jr. 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: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $61.00
Supplemental Benefit Rate per Hour: $60.06
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $62.00
Supplemental Benefit Rate per Hour: $62.25
*** 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: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $91.50
Supplemental Benefit Rate per Hour: $62.02
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $93.00
Supplemental Benefit Rate per Hour: $64.24
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Swing Shift)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $71.57
Supplemental Benefit Rate per Hour: $68.14
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $72.75
Supplemental Benefit Rate per Hour: $70.56
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Swing Shift Overtime after 7.5 hours)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $107.36

Supplemental Benefit Rate per Hour: $70.45
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $109.13
Supplemental Benefit Rate per Hour: $72.91
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $80.17
Supplemental Benefit Rate per Hour: $74.99
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $81.49
Supplemental Benefit Rate per Hour: $77.61
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Graveyard Shift Overtime after 7 hours)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $120.26
Supplemental Benefit Rate per Hour: $77.57
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $122.24
Supplemental Benefit Rate per Hour: $80.23
*** 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.

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: 7/1/2023 - 4/12/2024
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

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $32.00
Supplemental Benefit Rate per Hour: $27.20
First and Second Year "M" Wage Rate Per Hour: $27.50
First and Second Year "M" Supplemental Rate: $24.79

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: 7/1/2023 - 4/12/2024
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

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $48.00

Supplemental Benefit Rate per Hour: $29.23
First and Second Year "M" Wage Rate Per Hour: $41.25
First and Second Year "M" Supplemental Rate: $26.52

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: 7/1/2023 - 3/6/2024
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

Effective Period: 3/7/2024 - 6/30/2024
Wage Rate per Hour: $37.40
Supplemental Benefit Rate per Hour: $21.44
Supplemental Note: $19.31 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
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: 7/1/2023 - 4/17/2024
Wage Rate per Hour: $61.00
Supplemental Benefit Rate per Hour: $62.13
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/18/2024 - 6/30/2024
Wage Rate per Hour: $62.00
Supplemental Benefit Rate per Hour: $62.85
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2023 - 4/17/2024
Wage Rate per Hour: $46.66
Supplemental Benefit Rate per Hour: $47.16
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/18/2024 - 6/30/2024
Wage Rate per Hour: $47.66
Supplemental Benefit Rate per Hour: $48.72
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician - Electro Pole Maintainer

Effective Period: 7/1/2023 - 4/17/2024
Wage Rate per Hour: $40.61
Supplemental Benefit Rate per Hour: $42.88
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Effective Period: 4/18/2024 - 6/30/2024
Wage Rate per Hour: $41.61
Supplemental Benefit Rate per Hour: $44.45
*** 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.

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $77.49
Supplemental Benefit Rate per Hour: $40.28

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.

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $60.89
Supplemental Benefit Rate per Hour: $40.18

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
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

Cherrypickers 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $75.82
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $121.31

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, Cherrypickers. 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 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 person auger.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $73.45
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $117.52

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $69.49
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $111.18

Engineer - Heavy Construction Maintenance Engineer I

Installing, Repairing, Maintaining, Dismantling 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $73.08
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $116.93

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $97.21
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $155.54

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.89
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $75.02

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.20
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $77.12

Engineer - Heavy Construction Service Engineer

Gradalls: Concrete Pumps: Power Houses: Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: $65.49
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $104.78

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.10
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $70.56

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $70.20
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $112.32

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $65.46
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $104.74

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.91
Supplemental Benefit Rate per Hour: $46.68
Supplemental Note: $85.96 on overtime
Shift Wage Rate: $78.26

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
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

Engineer - Building Work Maintenance Engineers I

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $63.51
Supplemental Benefit Rate per Hour: $45.77
Supplemental Note: $84.14 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.46
Supplemental Benefit Rate per Hour: $45.77
Supplemental Note: $84.14 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $60.19
Supplemental Benefit Rate per Hour: $45.77
Supplemental Note: $84.14 on overtime

Engineer - Building Work Oilers II

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.93
Supplemental Benefit Rate per Hour: $45.77
Supplemental Note: $84.14 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.
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
Thanksgiving Day
Christmas Day

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $42.78
Supplemental Benefit Rate per Hour: $27.76
Supplemental Note: Overtime Benefit Rate - $33.27 per hour (time & one half) $38.77 per hour (double time).

Instrument Person

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $34.64
Supplemental Benefit Rate per Hour: $27.76
Supplemental Note: Overtime Benefit Rate - $33.27 per hour (time & one half) $38.77 per hour (double time).

Rodperson

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $29.50
Supplemental Benefit Rate per Hour: $27.76
Supplemental Note: Overtime Benefit Rate - $33.27 per hour (time & one half) $38.77 per hour (double time).

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $66.83
Supplemental Benefit Rate per Hour: $42.39
Supplemental Note: Overtime Benefit Rate - $59.89 per hour (time & one half) $77.38 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $49.67
Supplemental Benefit Rate per Hour: $42.39
Supplemental Note: Overtime Benefit Rate - $59.89 per hour (time & one half) $77.38 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.60
Supplemental Benefit Rate per Hour: $42.39
Supplemental Note: Overtime Benefit Rate - $59.89 per hour (time & one half) $77.38 per hour (double time).

Overtime Description
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $77.94
Supplemental Benefit Rate per Hour: $44.82
Supplemental Note: Overtime benefit rate - $63.41 per hour (time & one half), $82.00 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $56.07
Supplemental Benefit Rate per Hour: $44.82
Supplemental Note: Overtime benefit rate - $63.41 per hour (time & one half), $82.00 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.34
Supplemental Benefit Rate per Hour: $44.82
Supplemental Note: Overtime benefit rate - $63.41 per hour (time & one half), $82.00 per hour (double time).

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $72.66
Supplemental Benefit Rate per Hour: $44.37
Supplemental Note: Overtime benefit rate - $62.73 per hour (time & one half), $81.09 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $55.67
Supplemental Benefit Rate per Hour: $44.37
Supplemental Note: Overtime benefit rate - $62.73 per hour (time & one half), $81.09 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $35.79
Supplemental Benefit Rate per Hour: $44.37
Supplemental Note: Overtime benefit rate - $62.73 per hour (time & one half), $81.09 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.

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $90.59
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $144.94

Operating Engineer - Road & Heavy Construction II

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $93.75
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $150.00

Operating Engineer - Road & Heavy Construction III

Mine Hoists (Cranes, etc. when used as Mine Hoists)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $96.73
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $154.77

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $94.42
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $151.07

Operating Engineer - Road & Heavy Construction V

Pile Drivers & Rigs (working alongside Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $92.58
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $148.13

Operating Engineer - Road & Heavy Construction VI

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $88.01
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $140.82

Operating Engineer - Road & Heavy Construction VII

Barrier Movers, Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $71.33
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $114.13

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $55.65
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $69.81

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $83.78
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $134.05

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $77.11
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $123.38

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $60.16
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $96.26

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $88.94
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $142.30

Operating Engineer - Road & Heavy Construction XIII

Concrete Pumps, Concrete Plant, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $86.19
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $137.90

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $82.44
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $131.90

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $56.01

Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $89.62

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $78.79
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $126.06

Operating Engineer - Road & Heavy Construction XVII

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $79.36
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $126.98

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $113.37
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $181.39

Operating Engineer - Paving I

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $88.01
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $140.82

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: $85.79
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $137.26

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $72.72
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $116.35

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $94.01
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $56.43
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Concrete III

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $75.37
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $97.68
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Shift Wage Rate: $156.29

Operating Engineer - Steel Erection II

Cranes, 2 Drum Derricks, Hydraulic Cranes, Fork Lifts and Boom Trucks.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $93.89
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $150.22

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $56.29
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $90.06

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine. (Public Works Only)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.64
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
Shift Wage Rate: $85.82

Operating Engineer - Building Work I

Forklifts, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $73.47
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $55.13

Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $89.09
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $94.30
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $81.57
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $80.71
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $64.28
Supplemental Benefit Rate per Hour: $36.05
Supplemental Note: $65.90 overtime hours
For New House Car projects Wage Rate per Hour $51.40
For New House Car projects: Supplemental Benefit overtime hours: $50.98

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
Thanksgiving Day
Day after Thanksgiving
Christmas Day

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $55.05
Supplemental Benefit Rate per Hour: $47.88

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

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $47.95
Supplemental Benefit Rate per Hour: $53.34

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, Storm windows and storm doors, Herculite door repairs, Door closer repairs, Glass tinting.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $27.05
Supplemental Benefit Rate per Hour: $26.50

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $39.50
Supplemental Benefit Rate per Hour: $20.60

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: 7/1/2023 - 6/30/2024

Wage Rate per Hour: $69.96
Supplemental Benefit Rate per Hour: $35.76

Overtime Description
Premium rate shall be paid for supplemental benefits during overtime work.

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $38.93
Supplemental Benefit Rate per Hour: $31.27

House Wrecker - Tier B

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.16
Supplemental Benefit Rate per Hour: $23.68

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

Paid Holidays
None

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL

Iron Worker - Ornamental

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $47.15
Supplemental Benefit Rate per Hour: $63.75
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 should be paid for all work on a Saturday thereafter. Four (4), ten (10) hour days may be worked at straight time, Monday to Thursday.

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

Paid Holidays
None

Shift Rates
When two or three shifts are employed on a job, Monday through Friday, each shift will be paid eight (8) hours at the straight time rate for eight (8) hours of work; at time and one-half the regular straight time rate for the first two (2) hours of overtime worked beyond eight (8) hours; and at double time for all work thereafter. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, eight (8) hours will be paid at straight time rate for seven (7) hours of work, and all overtime shall be paid at time and one-half the regular straight time rates. On Saturday, 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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $57.20
Supplemental Benefit Rate per Hour: $86.77
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

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.50
Supplemental Benefit Rate per Hour: $52.23

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $36.64
Supplemental Benefit Rate per Hour: $17.55

Landscaper (Year 3 - 5)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $35.47
Supplemental Benefit Rate per Hour: $17.55

Landscaper (up to 3 years)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $32.55
Supplemental Benefit Rate per Hour: $17.55

Groundperson

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $32.55
Supplemental Benefit Rate per Hour: $17.55

Tree Remover / Pruner

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $42.51
Supplemental Benefit Rate per Hour: $17.55

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.80
Supplemental Benefit Rate per Hour: $17.55

Watering - Plant Maintainer

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.92
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: 7/1/2023 - 7/2/2023
Wage Rate per Hour: $57.82
Supplemental Benefit Rate per Hour: $42.86

Effective Period: 7/3/2023 - 6/30/2024
Wage Rate per Hour: $58.12
Supplemental Benefit Rate per Hour: $43.31

Marble Finisher

Effective Period: 7/1/2023 - 7/2/2023
Wage Rate per Hour: $44.77
Supplemental Benefit Rate per Hour: $40.16

Effective Period: 7/3/2023 - 6/30/2024
Wage Rate per Hour: $45.10
Supplemental Benefit Rate per Hour: $40.36

Marble Polisher

Effective Period: 7/1/2023 - 7/2/2023
Wage Rate per Hour: $43.97
Supplemental Benefit Rate per Hour: $32.76

Effective Period: 7/3/2023 - 6/30/2024
Wage Rate per Hour: $44.19
Supplemental Benefit Rate per Hour: $33.11

Marble Maintenance Finisher

Effective Period: 7/1/2023 - 7/2/2023
Wage Rate per Hour: $27.26
Supplemental Benefit Rate per Hour: $14.55

Effective Period: 7/3/2023 - 6/30/2024
Wage Rate per Hour: $27.44
Supplemental Benefit Rate per Hour: $14.77

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $43.80
Supplemental Benefit Rate per Hour: $29.39
before calculating premium wage deduct $3.00

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.

(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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $39.19
Supplemental Benefit Rate per Hour: $24.60
before calculating premium wage deduct $1.50

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.38
Supplemental Benefit Rate per Hour: $18.92
before calculating premium wage deduct $1.50

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.45
Supplemental Benefit Rate per Hour: $52.80
Supplemental Note: For time and one half overtime - $64.80 For double overtime - $81.60

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $58.70
Supplemental Benefit Rate per Hour: $57.11

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.40
Supplemental Benefit Rate per Hour: $45.67

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $51.79
Supplemental Benefit Rate per Hour: $45.67

Mosaic Mechanic - Machine Operator Grinder

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $51.79
Supplemental Benefit Rate per Hour: $45.67

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $43.00
Supplemental Benefit Rate per Hour: $40.88
Supplemental Note: $46.62 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.00
Supplemental Benefit Rate per Hour: $40.88
Supplemental Note: $46.62 on overtime

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
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(District Council of Painters #9)

PAINTER - LINE STRIPING (ROADWAY)
see PAVER AND ROADBUILDER - LINE STRIPING (ROADWAY)

PAINTER - METAL POLISHER

METAL POLISHER

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $32.93
Supplemental Benefit Rate per Hour: $11.99

METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $33.88
Supplemental Benefit Rate per Hour: $11.99

METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $36.43
Supplemental Benefit Rate per Hour: $11.99

ASSISTANT METAL POLISHER

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $25.71
Supplemental Benefit Rate per Hour: $11.51

ASSISTANT METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $26.66
Supplemental Benefit Rate per Hour: $11.51

ASSISTANT METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.21
Supplemental Benefit Rate per Hour: $11.51

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.

Holiday Pay
Only employees who have completed one year of service, including any trial period shall be eligible for 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.
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
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
Four Days a week at Ten (10) hours straight a day.

Local 8A-28A

PAINTER - SIGN

Sign Painter

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $45.54
Supplemental Benefit Rate per Hour: $22.29

Assistant Sign Painter

Effective Period: 7/1/2023 - 6/30/2024
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

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $54.50
Supplemental Benefit Rate per Hour: $51.33

Painter - Power Tool

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $61.00
Supplemental Benefit Rate per Hour: $51.33
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.02
Supplemental Benefit Rate per Hour: $40.51
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.85
Supplemental Benefit Rate per Hour: $51.87
Supplemental Note: For time and one half overtime - $56.37 For double overtime - $60.87

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.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.98
Supplemental Benefit Rate per Hour: $51.87
Supplemental Note: For time and one half overtime - $56.37 For double overtime - $60.87

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $49.45
Supplemental Benefit Rate per Hour: $51.87
Supplemental Note: For time and one half overtime - $56.37 For double overtime - $60.87

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.85
Supplemental Benefit Rate per Hour: $51.87
Supplemental Note: For time and one half overtime - $56.37 For double overtime - $60.87

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.98
Supplemental Benefit Rate per Hour: $51.87
Supplemental Note: For time and one half overtime - $56.37 For double overtime - $60.87

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
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)

PAVER AND ROADBUILDER - LINE STRIPING (ROADWAY)

Striping - Machine Operator

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $40.00
Supplemental Benefit Rate per Hour: $17.27
Supplemental Note: For time and one half overtime - $18.27 For double overtime - $19.27

Lineperson (Thermoplastic)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.00
Supplemental Benefit Rate per Hour: $17.27
Supplemental Note: For time and one half overtime - $18.27 For double overtime - $19.27

Striping Assistant & Traffic Safety

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $38.00
Supplemental Benefit Rate per Hour: $17.27
Supplemental Note: For time and one half overtime - $18.27 For double overtime - $19.27

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.

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 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)

PLASTERER

Plasterer

Effective Period: 7/1/2023 - 7/31/2023
Wage Rate per Hour: $52.08
Supplemental Benefit Rate per Hour: $23.74

Effective Period: 8/1/2023 - 6/30/2024
Wage Rate per Hour: $52.10
Supplemental Benefit Rate per Hour: $25.35

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
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: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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 (MECHNICAL EQUIPMENT AND SERVICE)
(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Plumber

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $47.45
Supplemental Benefit Rate per Hour: $20.51

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: 7/1/2023 - 6/30/2024
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
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: 7/1/2023 - 6/30/2024
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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $61.93
Supplemental Benefit Rate per Hour: $30.25

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
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. For projects bid and performed after July 1, 2023, the first shift shall be paid at the regular hourly rate plus a 5% differential.

(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $46.50
Supplemental Benefit Rate per Hour: $38.31

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

Sheet Metal Worker

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $52.60
Supplemental Benefit Rate per Hour: $56.93
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $42.08
Supplemental Benefit Rate per Hour: $56.93

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $19.30
Supplemental Benefit Rate per Hour: $12.35

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.

(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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $49.40
Supplemental Benefit Rate per Hour: $28.99
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.26
Supplemental Benefit Rate per Hour: $3.80

Shipyard Mechanic - Second Class

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.63
Supplemental Benefit Rate per Hour: $3.30

Shipyard Laborer - First Class

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $23.59
Supplemental Benefit Rate per Hour: $3.70

Shipyard Laborer - Second Class

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $18.43
Supplemental Benefit Rate per Hour: $3.43

Shipyard Dockhand - First Class

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $25.82
Supplemental Benefit Rate per Hour: $3.54

Shipyard Dockhand - Second Class

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $18.83
Supplemental Benefit Rate per Hour: $3.58

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $56.00
Supplemental Benefit Rate per Hour: $61.89

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $69.05
Supplemental Benefit Rate per Hour: $53.14
Supplemental Note: Overtime supplemental benefit rate: $105.54

Steamfitter -Temporary Services

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $52.48
Supplemental Benefit Rate per Hour: $43.57

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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $44.85
Supplemental Benefit Rate per Hour: $20.71

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: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$56.15**
Supplemental Benefit Rate per Hour: **$53.35**

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: 7/1/2023 - 6/30/2024
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.
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: 7/1/2023 - 6/30/2024
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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $48.78
Supplemental Benefit Rate per Hour: $32.36

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $63.46
Supplemental Benefit Rate per Hour: $35.51

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
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $54.05
Supplemental Benefit Rate per Hour: $54.99

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
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 #1556)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $71.86
Supplemental Benefit Rate per Hour: $63.35

Tunnel Workers (Compressed Air Rates)

Includes shield driven liner plate portions or solidification portions work (8 hour shift) during excavation phase.

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $69.30
Supplemental Benefit Rate per Hour: $61.35

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $68.14
Supplemental Benefit Rate per Hour: $60.14

Outside Lock Tender, Outside Gauge Tender,Muck Lock Tender (Compressed Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $66.78
Supplemental Benefit Rate per Hour: $59.16

Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $66.78
Supplemental Benefit Rate per Hour: $59.16

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $58.80
Supplemental Benefit Rate per Hour: $55.51

Blasters (Free Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $68.55
Supplemental Benefit Rate per Hour: $60.82

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$65.58**
Supplemental Benefit Rate per Hour: **$58.28**

All Others (Free Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$60.62**
Supplemental Benefit Rate per Hour: **$53.94**

Microtunneling (Free Air Rates)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$52.46**
Supplemental Benefit Rate per Hour: **$46.62**

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 8 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
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

(Local #147)

UTILITY LOCATOR
(Locate & mark underground utilities for street excavation.)

Utility Locator (Year 7 and above)

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$31.56**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 5 - 6)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$22.85**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 4)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$21.54**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 3)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$20.30**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 2)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$19.13**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 1)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$18.04**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Up to 1 year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$17.00**
Supplemental Benefit Rate per Hour: **$1.43**
Supplemental Note: No benefits for the first 90 days of employment.

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

WELDER AND FIREWATCH TO BE PAID AT THE RATE OF THE JOURNEYPERSON OR REGISTERED APPRENTICE 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.

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BOILERMAKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Boilermaker (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $34.37

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $36.39

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $38.41

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $40.40

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $42.43

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $44.44

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $46.46

(Local #5)

BRICKLAYER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Bricklayer (First 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.60

(Bricklayer District Council)

CARPENTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour For Building Apprentice: $20.20
Supplemental Benefit Rate Per Hour For Building Apprentice: $17.25

Wage Rate Per Hour For Heavy Apprentice: $25.60
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $37.31

Carpenter (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour For Building Apprentice: $23.20
Supplemental Benefit Rate Per Hour For Building Apprentice: $18.75

Wage Rate Per Hour For Heavy Apprentice: $31.20
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $37.31

Carpenter (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour For Building Apprentice: $27.45
Supplemental Benefit Rate Per Hour For Building Apprentice: $22.35

Wage Rate Per Hour For Heavy Apprentice: $39.58
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $37.31

Carpenter (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour For Building Apprentice: $35.33
Supplemental Benefit Rate Per Hour For Building Apprentice: $24.35

Wage Rate Per Hour For Heavy Apprentice: $47.97
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $37.31

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS
(Ratio of Apprentice to Journeyperson: 1 to 1, 2 to 5)

Carpenter - High Rise (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $18.27
Supplemental Benefit Rate per Hour: $17.55

Carpenter - High Rise (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.70
Supplemental Benefit Rate per Hour: $17.68

Carpenter - High Rise (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $31.28
Supplemental Benefit Rate per Hour: $17.81

Carpenter - High Rise (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $38.90
Supplemental Benefit Rate per Hour: $17.96

(Carpenters District Council)

CEMENT AND CONCRETE WORKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Cement & Concrete Worker (First 1333 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 53% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.79

Cement & Concrete Worker (Second 1333 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 69% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $19.72

Cement & Concrete Worker (Last 1334 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $21.30

(Cement Concrete Workers District Council)

CEMENT MASON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Cement Mason (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $19.92
Supplemental Benefit Rate per Hour: $15.61

Cement Mason (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.82
Supplemental Benefit Rate per Hour: $15.91

Cement Mason (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.22
Supplemental Benefit Rate per Hour: $16.02

(Local #780)

DERRICKPERSON & RIGGER (STONE)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 50% of Journeyperson's rate

Derrickperson & Rigger (stone) - Second Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $25.60
Supplemental Benefit Rate Per Hour: $37.31

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $31.20
Supplemental Benefit Rate Per Hour: $37.31

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $39.58
Supplemental Benefit Rate Per Hour: $37.31

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $47.97

Supplemental Benefit Rate Per Hour: $37.31

(Carpenters District Council)

ELECTRICIAN
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Electrician (First Term: 0-6 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $18.00
Supplemental Benefit Rate per Hour: $16.43
Overtime Supplemental Rate Per Hour: $17.63

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $18.00
Supplemental Benefit Rate per Hour: $17.18
Overtime Supplemental Rate Per Hour: $18.38

Electrician (First Term: 7-12 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $18.50
Supplemental Benefit Rate per Hour: $16.69
Overtime Supplemental Rate Per Hour: $17.92

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $18.50
Supplemental Benefit Rate per Hour: $17.44
Overtime Supplemental Rate Per Hour: $18.67

Electrician (Second Term: 0-6 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $19.50
Supplemental Benefit Rate per Hour: $17.22
Overtime Supplemental Rate Per Hour: $18.51

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $19.50
Supplemental Benefit Rate per Hour: $17.97
Overtime Supplemental Rate Per Hour: $19.26

Electrician (Second Term: 7-12 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $20.50
Supplemental Benefit Rate per Hour: $17.74
Overtime Supplemental Rate Per Hour: $19.10

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $20.50
Supplemental Benefit Rate per Hour: $18.49
Overtime Supplemental Rate Per Hour: $19.85

Electrician (Third Term: 0-6 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $18.27
Overtime Supplemental Rate Per Hour: $19.69

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $19.02
Overtime Supplemental Rate Per Hour: $20.44

Electrician (Third Term: 7-12 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $22.50
Supplemental Benefit Rate per Hour: $18.79
Overtime Supplemental Rate Per Hour: $20.28

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $22.50
Supplemental Benefit Rate per Hour: $19.54
Overtime Supplemental Rate Per Hour: $21.03

Electrician (Fourth Term: 0-6 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $23.50
Supplemental Benefit Rate per Hour: $19.31
Overtime Supplemental Rate Per Hour: $20.87

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $23.50
Supplemental Benefit Rate per Hour: $20.06
Overtime Supplemental Rate Per Hour: $21.62

Electrician (Fourth Term: 7-12 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $25.50
Supplemental Benefit Rate per Hour: $20.36
Overtime Supplemental Rate Per Hour: $22.05

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $25.50
Supplemental Benefit Rate per Hour: $21.11
Overtime Supplemental Rate Per Hour: $22.80

Electrician (Fifth Term: 0-12 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $26.75
Supplemental Benefit Rate per Hour: $24.13
Overtime Supplemental Rate Per Hour: $25.82

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $27.50
Supplemental Benefit Rate per Hour: $24.79
Overtime Supplemental Rate Per Hour: $26.52

Electrician (Fifth Term: 13-18 Months)

Effective Period: 7/1/2023 - 4/12/2024
Wage Rate per Hour: $31.25
Supplemental Benefit Rate per Hour: $26.55
Overtime Supplemental Rate Per Hour: $28.53

Effective Period: 4/13/2024 - 6/30/2024
Wage Rate per Hour: $32.00
Supplemental Benefit Rate per Hour: $27.20
Overtime Supplemental Rate Per Hour: $29.23

Overtime Description
Overtime Wage paid at time and one half the regular rate

(Local #3)

ELEVATOR CONSTRUCTOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator (Constructor) - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $34.18

Elevator (Constructor) - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $34.79

Elevator (Constructor) - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $36.01

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $37.23

(Local #1)

ELEVATOR REPAIR & MAINTENANCE
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: $34.59

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: $35.18

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: $36.37

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
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

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $27.47
Supplemental Benefit Rate per Hour: $32.38

Engineer - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $34.34
Supplemental Benefit Rate per Hour: $32.38

Engineer - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $37.77
Supplemental Benefit Rate per Hour: $32.38

Engineer - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $41.21
Supplemental Benefit Rate per Hour: $32.38

(Local #15)

ENGINEER - OPERATING
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 40% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $25.55

Operating Engineer - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $25.55

Operating Engineer - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $25.55

(Local #14)

FLOOR COVERER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $25.20
Supplemental Benefit Rate per Hour: $17.25

Floor Coverer (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.20
Supplemental Benefit Rate per Hour: $18.75

Floor Coverer (Third Year)

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: $32.45
Supplemental Benefit Rate per Hour: $22.35

Floor Coverer (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $40.33
Supplemental Benefit Rate per Hour: $24.35

(Carpenters District Council)

GLAZIER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Glazier (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Glazier (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Glazier (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Glazier (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $20.00
Supplemental Benefit Rate per Hour: $14.75

Handler (Second 1000 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.00
Supplemental Benefit Rate per Hour: $14.75

Handler (Third 1000 Hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.00
Supplemental Benefit Rate per Hour: $14.75

Handler (Fourth 1000 Hours)

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2023 - 6/30/2024

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

(Local #12)

HOUSE WRECKER
(TOTAL DEMOLITION)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

House Wrecker - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.30
Supplemental Benefit Rate per Hour: $10.97

House Wrecker - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $23.05
Supplemental Benefit Rate per Hour: $10.97

House Wrecker - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.55
Supplemental Benefit Rate per Hour: $10.97

House Wrecker - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $27.05
Supplemental Benefit Rate per Hour: $10.97

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Iron Worker (Ornamental) - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $25.98
Supplemental Benefit Rate per Hour: $16.00

Iron Worker (Ornamental) - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.45
Supplemental Benefit Rate per Hour: $18.00

Iron Worker (Ornamental) - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.80
Supplemental Benefit Rate per Hour: $19.00

Iron Worker (Ornamental) - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $34.39
Supplemental Benefit Rate per Hour: $21.00

(Local #580)

IRON WORKER - STRUCTURAL
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $29.73
Supplemental Benefit Rate per Hour: $60.12

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$30.33**
Supplemental Benefit Rate per Hour: **$60.12**

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$30.94**
Supplemental Benefit Rate per Hour: **$60.12**

(Local #40 and #361)

LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)
(Ratio Apprentice to Journeyperson: 1 to 1, 1 to 3)

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - First 1000 hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Second 1000 hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third 1000 hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $50.43

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Fourth 1000 hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Rate Per Hour: $50.43

(Local #731)

MARBLE MECHANICS
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 45% of Journeyperson's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Cutters & Setters - Seventh 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Cutters & Setters - Eighth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Ninth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Tenth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 900 Hours

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

Polishers & Finishers - Third 900 Hours

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.80
Supplemental Benefit Rate per Hour: $10.47

Mason Tender - Second Year

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: **$23.55**
Supplemental Benefit Rate per Hour: **$10.47**

Mason Tender - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$25.05**
Supplemental Benefit Rate per Hour: **$10.47**

Mason Tender - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$27.55**
Supplemental Benefit Rate per Hour: **$10.47**

(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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$20.70**
Supplemental Benefit Rate per Hour: **$10.82**

Mason Tender (Interior Demolition) - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$22.65**
Supplemental Benefit Rate per Hour: **$10.82**

Mason Tender (Interior Demolition) - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$24.15**
Supplemental Benefit Rate per Hour: **$10.82**

Mason Tender (Interior Demolition) - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: **$26.65**

Supplemental Benefit Rate per Hour: $10.82

(Local #79)

METALLIC LATHER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Metallic Lather (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $22.55
Supplemental Benefit Rate per Hour: $17.87

Metallic Lather (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $23.60
Supplemental Benefit Rate per Hour: $16.87

Metallic Lather (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.60
Supplemental Benefit Rate per Hour: $15.92

Metallic Lather (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $37.18
Supplemental Benefit Rate per Hour: $21.82

(Local #46)

MILLWRIGHT
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Millwright (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $31.74
Supplemental Benefit Rate per Hour: $36.74

Millwright (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $37.19
Supplemental Benefit Rate per Hour: $40.44

Millwright (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $42.64
Supplemental Benefit Rate per Hour: $44.79

Millwright (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $53.54
Supplemental Benefit Rate per Hour: $51.55

(Local #740)

PAINTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Painter - Brush & Roller - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $17.20
Supplemental Benefit Rate per Hour: $18.26

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $23.46

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2023 - 6/30/2024

Wage Rate per Hour: $25.80
Supplemental Benefit Rate per Hour: $27.72

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $34.40
Supplemental Benefit Rate per Hour: $35.83

(District Council of Painters)

PAINTER - METAL POLISHER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Metal Polisher (First Year)

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $17.00
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: 7/1/2023 - 6/30/2024
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 Journeyperson: 1 to 1, 1 to 3)

Painters - Structural Steel (First Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #806)

PAVER AND ROADBUILDER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.86
Supplemental Benefit Rate per Hour: $25.54

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $32.50
Supplemental Benefit Rate per Hour: $25.54

(Local #1010)

PAVER AND ROADBUILDER - LINE STRIPING (ROADWAY)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Paver and Roadbuilder - Line Striping (Roadway) - First Year (Minimum 1000 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.86
Supplemental Benefit Rate per Hour: $17.27

Paver and Roadbuilder - Line Striping (Roadway) - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $32.50
Supplemental Benefit Rate per Hour: $17.27

(Local #1010)

PLASTERER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)
(Each Term is 800 Hours.)

Plasterer - First Term

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $17.48

Plasterer - Second Term

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $18.63

Plasterer - Third Term

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $20.93

Plasterer - Fourth Term

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson'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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.45
Supplemental Benefit Rate per Hour: $10.32

Plasterer Tender - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $23.40
Supplemental Benefit Rate per Hour: $10.32

Plasterer Tender - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.90
Supplemental Benefit Rate per Hour: $10.32

Plasterer Tender - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $16.78
Supplemental Benefit Rate per Hour: $5.43

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $19.78
Supplemental Benefit Rate per Hour: $6.43

Plumber - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $28.99
Supplemental Benefit Rate per Hour: $21.95

Plumber - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $31.09
Supplemental Benefit Rate per Hour: $21.95

Plumber - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $33.94
Supplemental Benefit Rate per Hour: $21.95

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $35.34
Supplemental Benefit Rate per Hour: $21.95

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
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)

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $31.48
Supplemental Benefit Rate per Hour: $15.00

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $35.54
Supplemental Benefit Rate per Hour: $20.20

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $41.14
Supplemental Benefit Rate per Hour: $23.95

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $49.50
Supplemental Benefit Rate per Hour: $24.95

(Bricklayer District Council)

ROOFER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Roofer - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $3.97

Roofer - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $19.29

Roofer - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $23.09

Roofer - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $28.81

(Local #8)

SHEET METAL WORKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Sheet Metal Worker (0-6 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 25% of Journeyperson's rate
Supplemental Rate Per Hour: $7.19

Sheet Metal Worker (7-18 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: $20.98

Sheet Metal Worker (19-30 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $28.41

Sheet Metal Worker (31-36 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $33.59

Sheet Metal Worker (37-42 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $33.59

Sheet Metal Worker (43-48 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $41.37

Sheet Metal Worker (49-54 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $41.37

Sheet Metal Worker (55-60 Months)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $46.56

(Local #28)

SIGN ERECTOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: $17.84

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: $20.25

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $22.66

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $25.09

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $33.83

Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $36.81

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $40.63

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $43.70

Sign Erector - Fifth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $46.76

Sign Erector - Sixth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $49.80

(Local #137)

STEAMFITTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Steamfitter - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate and Supplemental Rate per Hour: 60% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate and Supplemental Rate Per Hour: 70% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2023 - 6/30/2024
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: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $21.71

Supplemental Benefit Rate per Hour: $13.75

Refrigeration & Air Conditioner (Second Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $26.21
Supplemental Benefit Rate per Hour: $15.09

Refrigeration & Air Conditioner (Third Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $30.53
Supplemental Benefit Rate per Hour: $16.49

Refrigeration & Air Conditioner (Fourth Year)

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $36.87
Supplemental Benefit Rate per Hour: $18.38

(Local #638-B)

STONE MASON - SETTER
(Ratio Apprentice of Journeyperson: 1 to 1, 1 to 2)

Stone Mason - Setters - First 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Third 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Fourth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Fifth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Sixth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: 100% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

(Bricklayers District Council)

TAPER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Drywall Taper - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $20.97
Supplemental Benefit Rate per Hour: $14.25

Drywall Taper - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $24.24
Supplemental Benefit Rate per Hour: $21.26

Drywall Taper - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $29.08
Supplemental Benefit Rate per Hour: $23.01

Drywall Taper - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate per Hour: $38.78

Supplemental Benefit Rate per Hour: $26.51

(Local #1974)

TILE LAYER - SETTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour:35% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour 40% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Seventh 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Tile Layer - Setter - Eighth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Ninth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour:80% of Journeyperson's rate

Tile Layer - Setter - Tenth 750 Hours

Effective Period: 7/1/2023 - 6/30/2024
Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

(Local #7)

TIMBERPERSON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $23.42
Supplemental Rate Per Hour: $37.27

Timberperson - Second Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $28.53
Supplemental Rate Per Hour: $37.27

Timberperson - Third Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $36.18
Supplemental Rate Per Hour: $37.27

Timberperson - Fourth Year

Effective Period: 7/1/2023 - 6/30/2024
Wage Rate Per Hour: $43.84
Supplemental Rate Per Hour: $37.27

(Local #1536)

THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER
1 CENTRE STREET ROOM 1120
NEW YORK, N.Y. 10007-2341

TELEPHONE: (212) 669-3622
FAX NUMBER: (212) 669-8499

Leonard A. Mancusi
SENIOR ASSISTANT COMPTROLLER

ALAN G. HEVESI
COMPTROLLER

MEMORANDUM

November 6, 2000

To *Agency Chief Contracting Officers*

From: *Leonard A. Mancusi*

Re: *Security at Construction Sites*

Prior to the enactment of Administrative Code §6-109, security guards on construction sites were not subject to prevailing wages. Security guards under the New York State labor law are covered under §230 which provides that prevailing wages are to be paid for security guards in existing buildings. §6-109 of the Administrative Code which was enacted in 1996 closed this loophole by including all security guards working pursuant to a city contract as a prevailing wage trade.

Although some construction contract boilerplate language has been amended to include §6-109, sub-contractors performing security services have advised us that they were not aware of this provision and, since traditionally, security guards were not a covered trade on construction sites, and they were not advised by a prime contractor that they would have to pay prevailing wages, they have not been doing so.

To avoid the possibility of issuing stop payments against prime contractors for the failure of their security service sub-contractors to pay

prevailing wages, we suggest that you write to all your existing security guard sub-contractors and their primes and in the future, upon approval of a security guard sub-contractor, advise the contractors of their obligation to pay prevailing wages under §6-109 of the Administrative Code.

As always, your cooperation is appreciated.

LAM:er
ACCO.SECURITY AT SITES

Department of Design and Construction

Issue Date: July 1, 2022

DDC STANDARD GENERAL CONDITIONS

FOR MULTIPLE CONTRACT PROJECTS

Department of Design and Construction

Issue Date: July 1, 2022

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Changes between the 3/15/2020 and 7/1/2022 Multiple 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	Update 1.10D: Mobilization Payment Add 1.16: Payments to M/WBE Subcontractors
01 22 00	New Section Added
01 31 00	1.6D: Include Preinstallation Conferences
01 33 00	1.6: include Coordination Drawings (?) 1.7 J-Q: Include additional Submittal information
01 40 00	1.4: include additional Definitions 1.5: include Engineering Services 1.7: update Quality Assurance qualification levels
01 42 00	1.3: update list of codes 1.4: update list of industry standards
01 50 00	3.8B.3: Update DDC Field Office Trailer requirements 3.8D.3: Update Equipment for the DDC Field Office requirements
01 60 00	New Section Added
01 73 00	Add 3.25 Correction of the Work
01 74 19	1.4: update Definitions 1.5: update Diversion requirements 1.7: update Submittal requirements Update Construction and Demolition Waste Management Log
01 77 00	Remove 3.2 Repair of the Work (moved into 017300, 3.25)
01 78 39	Throughout: revise references from printed Mylar and ink documents to PDF and digital electronic files
01 81 13.04	1.6C.2.a,C.3.a: update LEED Building Submittal Requirements 1.10: update links to references
01 81 13.10	New Section added
01 91 13	1.7.B.11, 12: update references for As Built Documents 1.8.R: include references to the NYC Energy Conservation Code 3.1.A.6: revise checklist and equipment start up requirements 3.1.A.12: add seasonal testing 3.3.E.4: include additional requirements for Functional Performance tests
01 91 15	3.1.A: update systems to be Commissioned 3.7.B.4: include additional information on Deficiencies

Department of Design and Construction

Issue Date: July 1, 2022

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DIVISION 01 – DDC STANDARD GENERAL CONDITIONS - MULTIPLE CONTRACT PROJECTS
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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.

C. MULTIPLE CONTRACTS: The Project involves multiple separate Contracts: (1) Contract for General Construction Work ("GC Contract"), (2) Contract for Plumbing Work ("Plumbing Contract"), (3) Heating/Ventilating/Air-Conditioning/Fire Protection Work ("HVAC Contract"), and (4) Electrical Work ("Electrical Contract"). The Contracts pertaining to the Project are set forth in the Addendum. These Division 01 Standard General Conditions are applicable to all Contracts for the Project and must constitute an integral part of each separate Contract to the same extent as though repeated in full therein.

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

B. This section includes a summary of each Contract, including responsibilities for coordination and temporary facilities and controls.

C. Specific requirements of each Contract are also indicated in individual Specification Sections and on Drawings.

D. Throughout these General Conditions, various responsibilities and obligations are assigned to each of the following four Contractors for:

   1) General Construction Work ("GC Contractor")

   2) Plumbing Work ("Plumbing Contractor")

   3) Heating/ Ventilating/ Air-Conditioning/ Fire Protection Work ("HVAC Contractor")

   4) Electrical Work ("Electrical Contractor")

   In the event the Project does not involve all four Contracts, the responsibilities and obligations of each omitted Contract must be assigned to one of the Contracts included in the Project. The Addendum specifies which Contractor must perform the responsibilities and obligations of each omitted Contract, as set forth in the General Conditions.

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.

D. PROGRESS SCHEDULE: Refer to Section 01 32 16 PROGRESS SCHEDULES for requirements of the Project.

E. COMPLETION OF WORK: Work to be done under each separate 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 each separate Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and must be performed by each 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 each 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, each Contractor will be deemed to have estimated the most expensive way of doing the Work unless each Contractor asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what must govern.

J. COOPERATION BETWEEN CONTRACTORS – Inasmuch as the completion of the Project within the prescribed limit of time is dependent largely upon the close and active cooperation of all those engaged herein, it is therefore expressly understood and agreed that the Contractor must lay out and install all work at such time or times and in such manner as not to delay or interfere with the carrying forward of the work of other Contractors. In the event of any dispute regarding possible or alleged interference between the various Contractors which may retard the progress of the work, the Contractor must file a dispute in accordance with the Article of the Contract entitled “Dispute Resolution”.

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 GC 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. PRINTS: Each Contractor, other than GC Contractor referred to in Paragraph B, will receive three (3) complete sets of paper prints of all Drawings listed in Paragraph A and specifications.

D. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.

E. 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.

F. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefore to the affected Contractor will be subject to the terms of the Contract. The Supplementary Drawings will be binding upon such Contractor with the same force as the Contract Drawings.

G. SUPPLEMENTARY DRAWING PRINTS - Three (3) copies of prints of these Supplementary Drawings will be furnished to the affected Contractor(s).

H. COPIES TO SUBCONTRACTORS - Each 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 SEPARATION OF WORK BETWEEN TRADES:

A. SCHEDULE E – Requirements for various items of work are included in the Specifications for the separate contracts for the Project and in the General Conditions. Schedule E delineates the responsibilities of each separate contractor for various items of work, as well as the extent to which certain items involve coordination between trades. Schedule E is included in the Addendum. The delineation set forth in Schedule E must be taken as specific instruction to each Contractor that is responsible for the listed items of work. Schedule E is not intended to limit the Contractor’s

responsibility for supervision and coordination as set forth in Paragraph B below. In the event of any conflict between the Specifications, the General Conditions and Schedule E, Schedule E must take precedence; provided, however, in the event of an omission from Schedule E (i.e., Schedule E omits either a reference to or information concerning an item of work which is set forth in the Specifications or the General Conditions), such omission from Schedule E will have no effect and the Contractor's obligation to perform the work, as set forth in the Specifications or the General Conditions, must remain in full force and effect.

B. SUPERVISION AND COORDINATION – Each Contractor is required to supply all necessary supervision and coordination information to other Contractors who are to supply work to accommodate their installation.

1.7 COORDINATION:

A. COORDINATION AND COOPERATION – Each Contractor must consult and study the requirements of the Contract Drawings and Specifications of all Contracts furnished to the Contractor, 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: - Each 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 each Contractor proceeds with any work. Figures must be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

1.8 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.

1.9 INTEGRATED DRAWINGS:

A. Refer to Section 01 33 00 – SUBMITTAL PROCEDURES for requirements of each Contractor.

1.10 TEMPORARY FACILITIES, SERVICES AND CONTROLS:

A. Refer to Section 01 50 00 TEMPORARY FACILITIES SERVICES AND CONTROLS and SCHEDULE E which is set forth in the Addendum for the responsibilities of each separate Contractor.

1.11 DUST CONTROL:

A. The GC 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.

1.12 SUBSTITUTIONS:

A. Each Contractor must cooperate with other Contractors involved to coordinate approved substitutions with remainder of the Work.

1.13 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. Each 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.

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

Each 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 Submittal Schedule; and,
7. Submission of the Pre-Construction Photographs.

E. ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING: Each 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.

1.14 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 affected 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.

1.15 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 Each 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.

1.16 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

(No Text on This Page)

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 must 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 will 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 (NOT USED)
PART III (NOT USED)

END OF SECTION 01 22 00

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: include without limitation the following:

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: Each 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. Each 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. Each 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: Each 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: Each 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 each Contractor and handled or disposed of as directed. Each Contractor must comply with all directions in the Specifications regarding the salvaging and handling of identified items, material or equipment.

F. Software: Each 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: Each 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), each 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 each 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 Contractors 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 each Contractor will then dictate a brief statement for the record.

2. Coordination: In addition to construction progress meetings called by the Resident Engineer, the GC Contractor must hold regularly scheduled meetings for the purpose of coordinating, expediting and scheduling the work of all Contracts in accordance with the master coordinated Job Progress Chart. All Contractors and their subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the GC 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 GC 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; each Contractor and their 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 each 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 GC 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. Each 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, each Contractor must prepare and submit an RFI in the form specified by the Resident Engineer.

1. RFI must originate with each 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 their subcontractors.
3. RFI Log: Each 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. Each 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

(No Text This Page)

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: include without limitation the following:

1.	Section 01 10 00	SUMMARY
2.	Section 01 32 22	PHOTOGRAPHIC DOCUMENTATION
3.	Section 01 32 16	PROJECT SCHEDULES
4.	Section 01 33 00	SUBMITTAL PROCEDURES
5.	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: Each 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, each 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, each Contractor must complete the Submittals Schedule, including all submission dates, required delivery dates, and fabrication times. Each Contractor must include an updated Submittals Schedule with all Progress Payment applications.

C. Review: The Resident Engineer will review the Submittals Schedule submitted by each Contractor. Upon acceptance, the Resident Engineer will date and sign the schedule as approved and transmit it to the Design Consultant, Contractors, and others within DDC as the Resident Engineer deems appropriate. If so directed by the Commissioner, the affected 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 affected Contractor must resubmit the Submittals Schedule as necessary to include all review comments.

2.2 REPORTS:

A. Daily Construction Reports: Each 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 each 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;

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: Each 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

(No Text on This Page)

SECTION 01 32 16
PROJECT SCHEDULES

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. Each Contractor must comply with Project schedule development and updating requirements as specified herein.

1. Each 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, each Contractor must provide the City with qualifications and experience of the proposed scheduling staff member(s).

2. Each 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. Each 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. Each 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).

B. In addition, the GC Contractor must prepare and maintain a Composite Schedule that covers the work of all Contractors. The Composite Schedule must meet all the requirements of a Project Schedule.

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.

Term	**Definition**
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.
Composite Schedule	A separate schedule prepared by the GC Contractor. The Composite Schedule Includes the work from each Contractor's Project Schedule.

Term	**Definition**
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.
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.

Term	**Definition**
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 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, PROJECT, AND COMPOSITE SCHEDULE PREPARATION TIMELINE:

A. Upon receipt of the NTP, each 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. The GC Contractor must prepare and submit the Composite Schedule promptly after the development of the preliminary Project Schedules and Baseline Schedules.

1. The preliminary Composite Schedule must be submitted no later than thirty (30) Days after NTP.

2. The initial submittal of the Baseline Schedule must be provided to the City for review no later than forty-five (45) Days after NTP.

3. The GC 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 ninety (90) Days after NTP to ensure that the Baseline Composite Schedule is accepted. The ninety (90) Days must include fourteen (14) Days review times for each submittal of the Baseline Composite Schedule.

4. Once accepted, the Baseline Composite Schedule will be the basis of Composite Schedule updates.

C. 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 AND COMPOSITE SCHEDULE DEVELOPMENT:

A. The preliminary Project Schedule and preliminary Composite 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 and preliminary Composite 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 and Baseline Composite Schedule.

1.7 PROJECT AND COMPOSITE 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 Contractors, but must be available for use by both the City and all Contractors.

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, any 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, any 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 Composite Schedule must meet all the requirements of this Article 1.7.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

A. The Baseline, Project, and Composite 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, Project, and Composite 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	Responsibility: Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	Phase: Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	Location: Breakdown by floor or elevation.
AREA	Area: 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	Trade: 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 and Composite Schedules. 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 GC Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS must be incorporated into the Composite Schedule and all Contractor's Baseline and Project Schedules.

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, each 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 each Project Schedule and the Composite Schedule must follow the DCMA and AACE International guidelines.

2. Each electronic submission of each Project Schedule and the Composite 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 and preliminary Composite Schedule, each 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 or Composite 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 and Composite 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 and Composite Schedules, 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 AND COMPOSITE SCHEDULE UPDATING:

A. The initial updating must take place immediately after the City accepts each Contractor's Baseline Schedule or Composite 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 and Composite 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 Contractors to review the Project and Composite Schedules and Narrative and jointly verify Project health and information.

E. In addition, the City may request meetings with any 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 any 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, any 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. All Contractors 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, each 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

(No Text on This Page)

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 GC Contractor must employ and pay for the services of a professional photographer who will take photographs showing the progress of the work for all Contracts.

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. Each 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 GC 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 GC 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 GC 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 each Contractor of responsibility for their 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(s) 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

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 INTEGRATED DRAWINGS:

A. The GC Contractor shall provide to the HVAC Contractor reflected ceiling starting points or plans, showing beam soffits elevations, ceiling heights, roof openings, etc.

B. The HVAC Contractor shall prepare a 3/8 inch scale drawing or drawings showing ductwork, heating and sprinkler piping. This drawing shall include location of grilles, registers, etc. and access doors in hung ceilings. Location shall be fixed by elevations and dimensions from column center lines and/or walls.

C. The HVAC Contractor shall prepare and issue a 3/8 inch scale original reproducible drawing or drawings of the above to the GC Contractor and a print of same to the Resident Engineer.

D. The GC Contractor shall lay out on the original reproducible drawing, the reflected ceiling plan, beam soffit elevations, ceiling heights, roof opening, etc. and issue the original reproducible drawing to the Plumbing Contractor, and a print of same to the Resident Engineer.

E. The Plumbing Contractor shall lay out on the original reproducible drawing its piping, valves, cleanouts, etc., indicating locations and elevations and shall indicate the necessary access doors, and issue the original reproducible drawing to the Electrical Contractor and print of same to the Resident Engineer.

F. The Electrical Contractor shall indicate on the original reproducible drawing its fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc., and issue the original reproducible drawing to the Resident Engineer.

G. The Resident Engineer will call as many meetings with each Contractor as are necessary to resolve any conflicts that become apparent. The Resident Engineer will call on the services of the Design Consultant where necessary.

H. Upon resolution of the conflicts, the HVAC Contractor shall provide a reproducible drawing of the coordinated drawing or drawings, which will become the Master Integrated Drawing. The Master Integrated Drawing shall be signed by each Contractor to indicate its acceptance of the arrangement of the work.

I. A reproducible copy of the Master Integrated Drawing or Drawings will be provided by the HVAC Contractor to each Contractor, the Resident Engineer and to the Design Consultant for information.

J. Each Contractor shall prepare its Shop Drawings in accordance with the Master Integrated Drawings. No work will be permitted without approved Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.

K. Each Contractor shall be held strictly accountable for cooperation in preparing the Integrated Drawing or 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 a 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. Each 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.

b. Each 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. Each 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 applicable Contractor as well as the subcontractor responsible for preparation of the Shop Drawings. Each Shop Drawing must be stamped with the following wording:

   a. 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 applicable 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 applicable Contractor must, in its statement, list and clearly describe each discrepancy. 8. Acceptance will be given based upon the applicable Contractor's representation that what is shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If the applicable 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 applicable Contractor.

8. Submission of Shop Drawings:

   a. Initial Submission: Each 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 applicable Contractor must make such corrections and changes and again transmit each shop drawing to the Design Consultant. The applicable 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 Contractors or 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 applicable Contractor and subcontractors so affected. [These accepted Shop Drawings must be distributed to the affected Contractor and 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 applicable 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 F, 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 applicable 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:

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 applicable 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 applicable 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.

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 the applicable 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 applicable 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**,** each 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

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 all Contractors and their subcontractors. 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 HVAC Contractor must follow these Contract Drawings in laying out the Work and verify the spaces in which it will be installed. The HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC Contractor will be required to pay for disconnecting, cleaning, and reconnecting wherever necessary for the purpose of locating and removing obstructions. The HVAC Contractor must pay for repairs to other work damaged in the course of removing obstructions. For work on existing piping, ducts, and equipment, the HVAC 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 HVAC Contractor must be designed by an Engineer licensed in New York State retained by the GC Contractor. Supporting structures must be built by the GC 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 HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC Contractor must make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The HVAC 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 HVAC 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

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 other than that included in the Contract for Electrical Work.

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 Electrical Contractor must notify the Commissioner when the Electrical 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 Electrical 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 Electrical 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 Electrical 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. Any 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, such Contractor must protect all equipment against theft, injury or damage from all causes. Such 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 such Contractor or replaced by such 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 Electrical 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 Electrical 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 Electrical 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 each 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 Plumbing Contractor and must extend one (1) inch above finished floor.

D. COORDINATION: Each 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. Each 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 who caused the damage. Each 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. Any Contractor who pierces waterproofing because of the installation of their work must, at their own expense, restore the waterproofing to the satisfaction of the Commissioner.

F. ELECTRICAL WORK AT SITE: Any 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 who furnished the unit, without additional cost to the City.

G. COOPERATION AMONG CONTRACTORS: Whenever an electrically operated unit or system involves the combined work of several Contractors for its installation and successful operation, each Contractor must require each subcontractor to exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.

H. WORK BY CONTRACTORS FURNISHING ELECTRICAL EQUIPMENT: Any Contractor who furnishes an electrically operated or motorized unit of equipment must install same and, as part of its Contract, perform the following work in connection therewith:

1. FOUNDATIONS: Unless otherwise specified or indicated, the Contractor furnishing electrically operated equipment must also furnish and install approved foundations for same. Special foundations, if required, will be described in the detailed Specification and/or in the Drawings.

   a. MATERIAL - All foundations, unless required otherwise, must rest on a structural slab and must be of poured concrete, of a mixture specified for reinforced concrete. Foundations must present a neat, smooth appearance without voids, sharp corners or edges.

   b. DIMENSIONS: Foundation dimensions, height above floor, methods of setting, aligning and anchoring of equipment mudt be as recommended by the manufacturer of equipment and approved by the Commissioner. The minimum height of foundations above finished floor must be four (4) inches and foundations must extend at least six (6) inches at all sides beyond the base plates of equipment.

2. At least one (1) inch of grout mudt be applied under the equipment base plate after placement and alignment of the equipment.

3. ITEMS: Anchor plates, bolts, sleeves, nuts and washers and other necessary items for proper installation of equipment must be provided. The Contractor must also furnish and set required templates to locate accurately the positions of the hold down bolts.

4. VIBRATION ISOLATION: If specifically required in the detailed Specifications for a particular unit, vibration isolators must be provided for rotating equipment.

5. SUPPORTS: If any motorized equipment is required to be mounted overhead or off a wall, the Contractor supplying the unit must furnish and install a suitable platform, bracket or shelf, whichever is appropriate or specified, and mount the equipment thereon. This support must be constructed of Galvanized steel members, plates, etc., and the whole securely fastened to the structure or to anchors previously embedded in the wall or slab. In case of excessive vibration transmitted to structure, isolating pads or other devices must be installed. The Contractor must apply one (1) coat of approved Galvanized primer paint to the support and one (1) additional coat of approved paint in the field.

6. ASSOCIATED EQUIPMENT: The Contractor who furnishes a motorized or electrically operated unit of equipment must also furnish all associated motor starters, disconnect means, relays, control devices, lamps, or other devices, necessary for the successful functioning of the unit.

7. POINT OF DELIVERY: Any item specified to be installed by the Contractor for Electrical Work and delivered to the site that cannot be hand carried (due to bulk, weight or timeliness) to the location of its installation is to be delivered and set in place, leveled and secured by the Contractor furnishing the equipment. Such delivery must be to the location where it is to be installed by the Contractor for Electrical Work.

8. CONTROL AND INTERLOCK WIRING:

   a. General Construction Work and Plumbing Work.

      (1) All control wiring associated with doors and door hardware is to be furnished and installed, unless otherwise indicated, by the Contractor furnishing the doors. Power for the door operation and for its controls must be furnished and installed by the Contractor for Electrical Work.

      (2) All other control wiring associated with equipment furnished by either the Contractor for General Construction Work or the Contractor for Plumbing Work is to be furnished and installed by the Contractor for Electrical Work.

   b. Contractor for Heating, Ventilating and Air Conditioning Work

      (1) The furnishing and installing of all control devices and all control and interlock wiring for equipment furnished under the Heating, Ventilating and Air Conditioning Contract must be by that Contractor, including any power required for any control device.

      (2) The Contractor for Heating, Ventilating and Air Conditioning Work must deliver to the Contractor for Electrical Work all starters and disconnect switches specified to be furnished under the Heating, Ventilating and Air Conditioning Contract. The Contractor for Electrical Work is to install the starters and disconnect switches, and furnish and install all power wiring and make connections between the starter, disconnect switch and motor or equipment being served. The motor or equipment is to be mounted by the Contractor furnishing the motor.

9. INSTALLATION OF BURNER: The Contractor who furnishes and installs the gas/oil-fired boiler/furnace must also include as part of its Contract, the work of furnishing, installing and connecting all equipment, controls with necessary conduits and wiring, to a service point provided by the Contractor for Electrical Work. Unless detailed otherwise in the Specifications, the Contractor for Electrical Work must furnish power from the power source to a junction box furnished and installed by the Contractor for the Electrical Work and located near the boiler/furnace control panel. The Contractor for Electrical Work must also furnish and install an empty conduit and a junction box to be located at a remote location (outside of the boiler/furnace room) for an emergency shut-off switch. The shut-off switch and all other conduit and wire must be furnished and installed by the Contractor furnishing the boiler/furnace.

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: The Contractor installing underground conduits, duct banks or manholes must perform as part of its contract 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 responsible for furnishing and installing the conduit 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 who installed them 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 who installed them as directed.

e. DRAG LINES: A drag line must be left in all empty conduit.

B. BOXES:

1. The Electrical 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 Electrical 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 Electrical 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 Electrical 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 Electrical 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 Contractor-furnishing a device containing lugs is to coordinate with the Electrical Work Contract Documents 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. This requirement applies to both the Electrical Contractor whose branch circuit protector must have lugs of the proper size, as well as to the Contractor who furnishes the device who may have to increase the size of that particular 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 mustow 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 Lamicoid 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 Electrical 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 Plasticile, 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. All of the aforementioned painting is to be done by the Contractor who furnishes the boxes and trim. Where panel trims or boxes are installed on walls which are to be painted, the previously mentioned third or finishing coat of paint must be included in the work of the Contractor who is responsible for the general interior painting.

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. Each Contractor who furnishes 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: ½ 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 who furnishes the motor 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 ½ horsepower or more, magnetic starters and circuit breakers must be used. Single phase A.C. motors smaller than ½ 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 Contractors who furnish electrically operated equipment must give to the Electrical Contractor full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

Equipment being installed by the Electrical Contractor must be delivered to the Electrical Contractor by other Contractors in proper time and sequence so that the Electrical Contractor will be able to meet its Project Schedule.

3.9 SCHEDULE OF ELECTRICAL EQUIPMENT

A. Schedule D, which is set forth in the Addendum, lists requirements for electrical motor equipment that may be included in one or more of the Specifications for the separate contracts for the Project. Schedule D delineates the responsibilities of each separate contractor for electrical motor control equipment. In the event of any conflict between the Specifications and Schedule D, Schedule D will 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 will have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, must remain in full force and effect.

END OF SECTION 01 35 06

(No Text on This Page)

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. Each 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 each 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 GC Contractor is responsible for conducting weekly documented jobsite safety meetings, given to all jobsite personnel including all Contractors and their 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. Each 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 applicable 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 each 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. Each 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 such 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 such 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 a 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 applicable 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 applicable Contractor has taken satisfactory corrective action, the Commissioner shall provide written notice to the Contractor that the Work may resume.

D. The applicable 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. Each 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 applicable Contractor or subcontractor(s).

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

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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 GC 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 GC 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

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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 each 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. Each 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 any 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-Warrantied 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.

1. **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.

2. **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 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 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. Each 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 the applicable 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 the 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.

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 each 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 appropriate 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 Resident Engineer 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.

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. 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.

F. 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.

G. 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.

H. 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.

I. No Shipping Before Inspection: The Contractor must comply with the foregoing before shipping any material.

J. 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.

K. 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.

L. 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.

M. Reports: Six (6) copies of the reports must be submitted and authoritative certification thereof must be furnished to the Commissioner as a prerequisite for the acceptance of any material or equipment.

N. 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.

O. 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, each 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: Each Contractor will be responsible for and must obtain all final approvals for the Work installed under its 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 Commissioner through the Resident Engineer.

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 Resident Engineer. Additional costs resulting from retesting, re-inspecting, replacing of material and/or damage to the Work and/or Work of other Contractors, 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

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

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

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	Charted 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

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
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.
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)
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
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
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)

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)

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.
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

(No Text on This Page)

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.

Term	Definition
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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 responsible for the installation of each permanent facility, services, and controls 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 Plumbing 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 GC Contractor must file an application with DEP for the schedule of charges for water use during construction. The GC Contractor will be responsible for payment of water charges.

2. Immediately after the Commissioner has issued an order to start the Work, the Plumbing 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 all Contractors and his/ her subcontractors. A copy of the above-mentioned permit must be filed with the Commissioner. The Plumbing 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 Plumbing 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 Plumbing Contractor must take the necessary precautions to prevent the temporary water system from freezing. The Plumbing 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 Plumbing 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 GC 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 Plumbing Contractor must restore the existing water system to conditions existing before initial use.

2. The Plumbing Contractor will be responsible for all repairs to the existing water system permitted to be used for temporary water service during construction. The GC Contractor will be responsible to maintain the existing system in a clean condition on a daily basis, acceptable to the Commissioner.

3. The GC 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 Plumbing 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 Plumbing 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).

E. OVERTIME USE: Whenever any Contractor(s) work before or after the regular work hours hereinafter specified under Subparagraph 3.2 F, or on a Saturday, Sunday or Holiday of any Contract, such Contractor(s) must pay the Plumbing Contractor for the activation of the temporary water system and toilet facility services during such overtime periods. When more than one (1) Contractor is involved in overtime work, the costs thereof will be prorated as determined by the Resident Engineer. When overtime is required by any or all Contractors on the work, the provisions for payment for regular time use of the temporary water supply system as specified in Subparagraph 3.2 F will apply.

F. ACTIVATION - The Plumbing Contractor must bear the cost of keeping the temporary water supply system activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning, to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for aforementioned trades and holds until completion and final acceptance of the work of the Plumbing Contractor or until the services are terminated by instructions from the Commissioner.

3.3 TEMPORARY SANITARY FACILITIES:

A. The GC 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 GC Contractor must provide temporary single-occupant toilet units of the chemical, aerated re-circulation, 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 GC 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 GC 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 GC Contractor must maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs.

3. NUISANCES - The Contractors must not cause any sanitary nuisance to be committed by its employees 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 Electrical 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 Contracts, 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 Electrical Contractor must make all necessary arrangements with the public utility company and pay all charges for the Temporary Electric Power system. The Electrical 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 Electrical Contractor will make payment directly to the public utility company.

   b. APPLICATIONS FOR METER: The Electrical 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 Electrical 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 Electrical 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 Electrical 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 for the electrical energy consumed.

   c. The Electrical 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 Electrical 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 Electrical 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 Electrical 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 Electrical 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 Electrical 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 Electrical Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 D

D. TEMPORARY LIGHTING SYSTEM:

1. The Electrical 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 Electrical 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 Electrical 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 various Contracts.

5. RELOCATION: Each Contractor requiring the relocation or extension of the original Temporary Lighting System that is not required due to the normal advancement of the work, as determined by the Resident Engineer, must bear all costs thereof.

6. PIGTAILS: The Electrical Contractor must furnish pigtails with left-hand sockets with locked-type guards and forty (40) feet of rubber covered cable. The Electrical Contractor must furnish and distribute a minimum of three (3) complete pigtails to each Contractor. See the detailed Electrical Specifications for possible additional pigtails required.

7. LAMPS: The Electrical 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 Electrical Contractor, while those in the trailers will be replaced by each Contractor using such equipment. All lamps must be compact fluorescent.

8. CIRCUIT PROTECTION: The Electrical Contractor must furnish and install Ground Fault Interruption (GFI) protection for the temporary lighting and site security lighting systems.

9. ENERGIZING: The Electrical Contractor must keep the Temporary Lighting System energized from a period of time, 15 minutes before the established starting time of that trade, which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for any trade involved in the construction of this facility and holds until Substantial Completion and Final Acceptance of the work of the Electrical Contractor or until the services are terminated by instructions from the Commissioner.

10. MAINTENANCE OF TEMPORARY LIGHTING SYSTEM:

    a. The Electrical Contractor must maintain the Temporary Lighting System in good working order during the scheduled hours established.

    b. The Electrical 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.

11. ADJUSTMENT IN CONTRACT PRICE FOR TEMPORARY LIGHTING MAINTENANCE: In the event that the temporary lighting maintenance extends beyond the Contract time through no fault of the Electrical Contractor, as determined by the Commissioner, the additional maintenance cost will be in accordance with the requirements of the following paragraphs:
    a. Payment for maintaining Temporary facilities when required will be made at the average hourly wage for electricians plus 69% of this rate, for each hour of work done upon order of the Resident Engineer. Payments will be included in partial estimates upon submission of detailed vouchers stating date, hour and time expended for each item of work.
    b. The addition of 69% of the average hourly wage rate specified above will be deemed as the total allowance for all profit and overhead and for any and all other costs and expenses of any nature whatsoever, including but not limited to allowance for insurance, workman's compensation, unemployment insurance and other supplementary benefits.

12. REMOVAL OF TEMPORARY LIGHTING SYSTEM: The temporary lighting system must be removed by the Electrical Contractor when authorized by the Commissioner.

13. 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 each 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 Electrical 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. All Contractors must 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 Contractor, that 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 Electrical Contractor.

5. The site security lighting must be kept illuminated at all times during the hours of darkness. The Electrical 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 Electrical 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 Electrical Contractor and must be removed and disposed of by the Electrical 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. 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 Contractors' responsibilities for the provision of Temporary Heat, including all expenses in connection therewith, will be 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, each 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 HVAC 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 HVAC 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 HVAC Contractor must provide Temporary Heat in accordance with the approved plan until written acceptance by the Commissioner of the Work of all Contractors, including punch list Work, unless directed otherwise in writing by the Commissioner. The responsibility of the HVAC 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 HVAC 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 HVAC Contractor will be responsible for the provision of Temporary Heat and such Contractor 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 GC 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 HVAC 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 GC 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 HVAC 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 HVAC 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 HVAC 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.

Contract Duration	Full Heating Seasons Required
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 devises 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 HVAC 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 GC Contractor will coordinate with the HVAC Contractor in the work of providing Temporary Heat, and must coordinate its operations in order to insure sufficient and timely performance of of the work under all Contracts . The GC 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 GC 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 by the HVAC Contractor, the GC 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 GC 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:

   a. The HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC 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 HVAC Contractor must include such Allowance amount in its total Contract price. The HVAC 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 HVAC 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 that after enclosure of the building, the Commissioner determines that (i) Contractors other than the HVAC Contractor have not sufficiently advanced the work of their contracts that is necessary and required to permit the HVAC Contractor to use the permanent or other heating equipment for the provision of Temporary Heat, and (ii) the HVAC Contractor does not bear any responsibility for such other Contractors' failure to advance the work, the City will pay the HVAC Contractor for all differential costs for labor, material, and equipment necessary and required for the provision of a substitute system(s) for the provision of Temporary Heat or portions thereof in lieu of the permanent or other systems intended for Temporary Heat. Payment will be made in accordance with Article 26 of the Contract, except that the cost of fuel will be as set forth in Paragraph (c) below.

3. In the event the Commissioner determines that there is a need for maintenance of the permanent heating system by the HVAC Contractor after written acceptance by the Commissioner of the work of all Contractors, and that the need for such maintenance is not the fault of the HVAC Contractor, the HVAC Contractor will provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City will pay the HVAC 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 will be made in accordance with Article 26 of the Contract, except that the cost of fuel will 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 HVAC 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 HVAC Contractor must present original invoices for the same. DDC reserves the right to furnish the required fuel.

d. Deduction - In the event that any amount of the allowance set forth herein is expended for payment to the HVAC Contractor under the circumstances set forth in Paragraph b.(2) above, the Commissioner will deduct and retain such amount out of moneys that are due and owing hereunder to the other Contractor(s) responsible for the failure to advance the work, as determined by the Commissioner. In the event the amount expended from the allowance exceeds the total sum due and owing to such other Contractor(s), such excess will be paid to the City by such other Contractor(s) immediately upon demand.

I. RELATED ELECTRICAL WORK:

1. The Electrical 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 Electrical Contractor must provide such items promptly when required and must in all respects coordinate its work with the GC Contractor and the HVAC Contractor in order to facilitate the provision of Temporary Heat by the HVAC Contractor.

   a. The Electrical 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 his Contract.

   b. The Electrical 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 by the HVAC Contractor. Such power must be provided by the Electrical Contractor for the duration the HVAC 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 Electrical 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 Plumbing 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 its Contract. The Plumbing Contractor must include all expenses in connection with such items of Work in its total Contract price. The Plumbing Contractor must provide such items of Work promptly when required and must in all respects coordinate its Work with the GC Contractor and the HVAC Contractor in order to facilitate the provision of Temporary Heat by the HVAC Contractor.

2. In the event portions of the permanent plumbing equipment furnished by the Plumbing Contractor as part of the Work of his Contract are used for the provision of Temporary Heat by the HVAC Contractor, either during construction or prior to acceptance by the City of the complete plumbing system, the Plumbing 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 its 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 Plumbing 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. The GC 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. Each 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 each 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: Each 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 GC Contractor must provide and install a lockset for the door to secure the equipment in the room. The GC Contractor must provide two (2) keys to the Resident Engineer. After completion of the Project the GC 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 GC 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 GC 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 GC 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 GC 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 GC Contractor must provide at its own cost and expense a mobile office trailer for use as the DDC Field Office. The Plumbing and Electrical Contractors 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 GC 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 GC 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 GC 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.

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 Electrical 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 Plumbing 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.

The Plumbing Contractor to frost-proof all water pipes to prevent freezing.

1) REPAIRS, MAINTENANCE: The Plumbing 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 Plumbing Contractor and must be plugged at the mains. All piping must become the property of the Plumbing 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 GC Contractor.

b. ELECTRICAL WORK:

1) The Electrical 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) The Electrical Contractor must make all arrangements and pay all costs to provide electric service.

4) The Electrical 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 GC Contractor.

c. MAINTENANCE

1) The GC 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 GC 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 GC 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 the Plumbing and Electrical Contractors 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 GC Contractor.

d. TELEPHONE SERVICE: The GC 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 GC Contractor must make the necessary arrangements and obtain all permits and pay all fees required for this Work.

C. RENTED SPACE: The GC 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 GC 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: The GC Contractor must furnish a 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 GC 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 GC 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' warrantees. All items must remain the property of the City of New York at the completion of the Project.

3. COMPUTER WORKSTATION: The GC 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 do not require computers.

2) Computers furnished by the GC 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. Wideband Internet connectivity at a minimum throughput of fifteen (15) Mbps download and five (5) Mbps upload is required at each field office location with 1-5 staffers. For larger field offices see table below for minimum required upload 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 (*Minimum*)**	**Upload Speeds (*Minimum*)**
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 GC 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 GC 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 GC Contractor and must be replenished by the GC Contractor as required by the Resident Engineer.

8) It is the GC 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 GC 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 GC Contractor.

3.9 MATERIAL SHEDS:

A. Material sheds used by each 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. Each Contractor must store combustible materials apart from the facility.

3.10 TEMPORARY ENCLOSURES:

A. The GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 Contractors' activities, which will provide food and shelter to the resident rodent population must be corrected by the GC 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 GC Contractor must be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper-proof bait stations. The GC Contractor must also be responsible for posting and maintaining signs announcing the baiting of each particular location.

5. The GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC Contractor.

3. Prior to commencement of tree Work, the GC Contractor must submit to the Commissioner a copy of a valid ALB compliance agreement entered into with NYSDAM and the GC Contractor or its subcontractor performing tree Work. If any host material is transported from the quarantine area the GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC Contractor’s bid for the Project.

3.16 PROJECT IDENTIFICATION SIGNAGE:

A. The GC 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC Contractor must commence production and installation of the sign.

4. Removal: At the completion of all Work under the Contract, the GC 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 ½" 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 GC 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-SETION 3.17 B

B. PROJECT RENDERING:

1. Responsibility: In addition to the Project sign, the GC 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 GC 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 GC 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 GC Contractor must provide a competent security guard service on the Site, beginning on the date on which the GC 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 GC 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 GC Contractor upon the written demand of the Commissioner.

4. Each security guard furnished by the GC Contractor must be instructed by the GC Contractor to include in his/her duties the entire construction Site including the Field Office, temporary structures, and equipment, materials, etc.

5. Should any Contractor consider the security requirements outlined above inadequate, that 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 who provides the additional protection.

6. Nothing contained in this sub-section must diminish in any way the responsibility of each Contractor for its own Work, materials, tools, equipment, nor for any of the other risks and obligations outlined hereinbefore in this Article.

B. COSTS: The GC 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 GC Contractor.

C. RESPONSIBILITY: All Contractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

3.19 SAFETY:

A. Each 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 GC 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 GC 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 all Contractors and representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. The GC 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 GC 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 GC 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. The Electrical Contractor will pay the costs of all electrical current used for operating the temporary elevators.

D. ACTIVATION TIME: The GC Contractor must keep the temporary elevator activated from a period of time of 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.

E. COMMENCEMENT OF SERVICE: The GC 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 GC 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.

F. ELECTRICAL INSTALLATION: The Electrical 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 Electrical 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 Electrical Contractor must make all these

required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

G. REMOVAL: As directed by the Commissioner and when elevators for permanent use have been installed and are in proper condition for service, the GC 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.

H. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the GC 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 GC 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.

I. REPLACEMENT: The GC 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 GC Contractor except for the replacement of hoisting ropes.

J. 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 all Contractors and 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 various Contractors 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. The particular Contractor using the elevator for the hoisting of its material will be responsible for any damage to the elevator during the entire period of such use. The GC Contractor must give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the particular Contractor(s). As indicated above, the GC Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

K. PAYMENT FOR USE: The GC Contractor must be paid for its operation and maintenance of the temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the Item of its Contract. All other costs in connection with the elevator installation and equipment, excepting electrical work done by the Electrical Contractor under its Contract, must be included in the Total Bid price submitted by the GC Contractor.

L. LIQUIDATED DAMAGES: The GC 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 GC 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 GC 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 all Contractors and representatives of DDC, and other governmental agencies having jurisdiction of work at the Project. The GC 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 GC 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 GC 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. The Electrical Contractor will pay the costs of all electrical current used for operating the temporary elevators.

D. ACTIVATION TIME: The GC Contractor must keep the temporary elevator activated from a period of time of 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.

E. LOW RISE ELEVATOR: The GC 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 GC 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 GC 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.

F. ELECTRICAL INSTALLATION: The Electrical 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 Electrical 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 Electrical Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

G. HIGH RISE ELEVATOR: The GC 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 GC 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 GC 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.

H. ELECTRICAL INSTALLATION: The Electrical 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 Electrical 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 Electrical Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

I. When the high-rise elevator is completed and ready for temporary operation, the low-rise temporary elevator must be shut down.

J. 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 GC 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.

K. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the GC 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 GC 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.

L. REPLACEMENT: The GC 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 GC Contractor except for the replacement of hoisting ropes.

M. 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 all Contractors and 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 various Contractors 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. The particular Contractor using the elevator for the hoisting of its material will be responsible for any damage to the elevator during the entire period of such use. The GC Contractor must give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the particular Contractor(s). As indicated above, the GC Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

N. PAYMENT FOR USE: The GC Contractor must be paid for its operation and maintenance of each temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the item of its Contract. All other costs in connection with elevator installation and equipment, excepting Electrical Work done by the Electrical Contractor under its Contract, must be included in the Total Bid Price submitted by the Electrical Contractor for Electrical Work.

O. LIQUIDATED DAMAGES: The GC 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 GC 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 GC Contractor may use, at the Commissioner’s discretion, one (1) selected elevator in the building for temporary operation by the GC Contractor for the transportation of employees of all Contractors and

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 GC 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. ACTIVATION TIME: The GC Contractor will keep the temporary elevator activated from a period of time of 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.

D. REPLACEMENT: The GC 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 GC 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.

E. 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 all Contractors and 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 various Contractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation. The particular Contractor using the elevator for the hoisting of its material will be responsible for any damage to the elevator during the entire period of such use. The GC Contractor must give notification in writing to the Resident Engineer of any alleged employed for the hoisting of materials by the particular Contractor(s). As indicated above, the GC Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

F. LIQUIDATED DAMAGES: The GC 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 GC Contractor.

3.4 TEMPORARY HOISTS AND HOISTWAYS (FOR MATERIAL AND PERSONNEL):

A. RESPONSIBILITY: The GC Contractor must provide adequate numbers of material hoists for the most expeditious performance of all parts of the Work. All other Contractors are required to provide their own facilities for the hoisting of materials under their respective Contracts. However, these Contractors may make arrangements, whenever possible, with the GC Contractor for the use of its hoist upon such terms and conditions as it may prescribe.

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 other Contractors. 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.

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 of any Contractor.

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

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. Each 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 GC 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 GC 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 GC 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 GC Contractor must also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.

C. The GC 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 GC 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 GC 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 GC 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 GC 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 GC 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

(No Text on This Page)

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.

Term	**Definition**
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 II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 DELIVERY OF MATERIALS:

A. Material Orders: Each 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: Each 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: Each Contractor must coordinate deliveries in order to avoid delaying or impeding the progress of the Work of any related Contractor.

E. Handling: Each 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 other Contractor, the relevant 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: Each 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. Each 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 applicable 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: Each 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 relevant Contractor(s) in connection with the performance of the Work.

B. Responsibility: Each 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: Each Contractor must safeguard all points, stakes, grade marks and bench marks made or established by each Contractor on the Work. Each 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 GC 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 GC Contractor must establish the permanent lines of exterior walls. The GC 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 GC 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 GC 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 GC 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 GC 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, each Contractor must investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, each 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, each Contractor must investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, each 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. Each 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. Each 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.

D. 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 GC Contractor must comply with all federal, state and local asbestos regulations affecting the work for this Contract.

B. Contractor Responsibility: The GC 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 GC 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 GC Contractor must comply with all federal, state and local environmental waste disposal regulations which may be required during the Work. The GC Contractor is required to hire licensed abatement and disposal companies for the requisite Work.

3.7 PREPARATION:

A. Field Measurements: Each 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, each 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. Each 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: Each 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, each Contractor must coordinate with authorities having jurisdiction.

D. Space Requirements: Each 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, each Contractor must defer construction Work limited to adequate areas as approved and certified by the Commissioner.

B. Each 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: Each 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. Each 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. Each Contractor must be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

3.11 TRANSPORTATION:

A. Availability: Each 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 applicable 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, each 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 each 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: Contractors required to furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment that is to be built into the work performed by the GC Contractor, must promptly furnish and set such sleeves or other materials in conformity with the requirements of the project.

B. Cooperation of Contractors: All Contractors and their 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 affected 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 GC 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 or Contractors responsible therefore.

D. Inserts: The GC 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 Plumbing, HVAC, and Electrical Contractors 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. Each 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. Each Contractor must not predicate its layout Work on unapproved sketches.

3.14 CUTTING AND PATCHING:

A. Responsibility: Each Contractor must do all cutting, patching, and restoration required by its Work, unless otherwise particularly specified in the Specifications of its Contract.

B. Restore Work: Each Contractor must restore any Work they damage that is the work of another Contractor..

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. Each Contractor must remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

G. Existing Warranties: Each 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: Each 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 GC 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: Each 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: Each Contractor must clean the Project Site and Work area daily, sweep up, and deposit at a location designated on each floor by the GC Contractor, 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 by the GC Contractor.

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 each Contractor is responsible for the removal of all rubbish, etc., from the Site, each Contractor must employ and keep engaged for this purpose an adequate number of laborers.

E. Surplus Materials: Each 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 each 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. Each 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. Each Contractor must 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 GC Contractor must take over and maintain the Project Site, after order to start Work.

B. The GC 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 GC 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 GC 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 GC 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 GC Contractor must take over and maintain all Project areas, after order to start Work.

B. Until the date of Final Acceptance, the GC 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 GC Contractor's own expense, except as otherwise specified, protect same and maintain them in at least as good condition as that in which the GC 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 GC 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 GC 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 GC 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 each Contractor:

1. Allowances are to be utilized when ordered and authorized in writing by the Commissioner.

2. Each 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, each Contractor must complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Each 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 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

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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.

Term	**Definition**
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. 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. 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.

Term	Definition
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 GC Contractor must refer to Section 01 33 00 SUBMITTAL PROCEDURES for submittal requirements.

B. The GC Contractor must be responsible for the development and implementation of a Waste Management Plan for the Project. Each Contractor must assist in the development of that Plan, and collect and deposit their Waste and Recyclable materials in accordance with the approved Plan. The GC Contractor must be responsible for all waste removal from the project site.

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 GC Contractor must submit to the Commissioner a Draft Waste Management Plan. Include separate sections for demolition and construction waste (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 steams.
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 GC 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 GC Contractor must submit a Final Waste Management Plan.

E. Progress Reports: The GC 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. The GC 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 GC 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 GC 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 GC Contractor must implement the Waste Management Plan, coordinate the Plan with each Contractor and all affected subcontractors, 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 GC 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 GC Contractor must oversee and document the results of the Plan. Monies received for salvaged materials must remain with the applicable 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 Contractors and subcontractors: Each Contractor and subcontractor must be responsible for collecting its Waste, non-Returned surplus materials and rubbish, in accordance with the Waste Management Plan.

D. Distribution: The GC Contractor must distribute copies of the Waste Management Plan to each Contractor, subcontractor, Resident Engineer, Construction Manager, and the Commissioner.

E. Instruction: The GC 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.
3. Comply with the General Conditions for controlling dust and dirt, environmental protection, and noise control.

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

Department of Design and Construction

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT LOG

Project Name: ______________________________ Contractor: ______________________________

Project I.D.: ______________________________ Prepared by: ______________________________

For Month: ______________________________

Haul Date	Ticket #	Hauling Company	*Material Type[2]	Sorting Method[5]	Material Quantity (tons or cubic yards)[1] *Total Weight	Excluded Material[3]	*Diverted Material[4]	*Landfilled Material	*Material Recipient
					*Total		*Diverted	*Landfilled	
			Monthly Totals						
			% Diverted this Month*						
			Cumulative Totals						
			% Diverted to Date						

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.

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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. Each 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.

Term	Definition
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, each 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. Each 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: Each 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 the applicable 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 applicable 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, each 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 applicable Contractor(s).

3. Submit pest-control final inspection report and survey as required in Section 01 50 00 TEMPORARY FACILITIES, SERVICES 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: Each 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 applicable Contractor(s) 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 applicable Contractor(s) 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, each 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. Each 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. The GC Contractor must 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. The HVAC Contractor will be responsible to clean ducts, blowers, and coils if units were operated without filters during construction.

r. The Electrical Contractor will be responsible to 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 applicable 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.

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 toolsand 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 COMMISSIONNING 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 each 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 each Contractor to modify the Contract Drawings to indicate all changes and corrections, if any, occurring in the Work as actually installed. Each 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. <u>All professional seals must be blocked out</u>. Title box complete with Project title and Design Consultants' names will remain.

C. Maintenance of Documents and Samples: Each 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. Each 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, each 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. Each 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.

Term	**Definition**
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: Each 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, each 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 (l/2) inch high, and contain the following data:

AS-BUILT CONTRACT RECORD DRAWING

Contractor's Name		_____
Contractor'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: Each 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. Record of changes (a caption description of work affected, and the date and number of change order or other authorization)
    f. 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. Each Contractor as applicable must submit three (3) copies each of preliminary manuals to the Resident Engineer for review and approval. Each 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. Each 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: The GC Contractor will 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: Each 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: Each 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." Each 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, each 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. Each Contractor must submit the final completion construction photographs, in compliance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.

2.6 OPERATING AND MAINTENANCE MANUALS:

A. Each 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. Dates of the Work covered by the contents of the Project Manual.
6. 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. Each Contractor must submit the final certification and final survey in compliance with Section 01 73 00 EXECUTION.

2.8 DEMONSTRATION AND ORIENTATION DVD:

A. Each 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:

A. SCHEDULE B: Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum.

B. FORM: For all guaranty requirements set forth in Schedule B, each Contractor must provide a written guaranty, in the form set forth herein.

C. 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

(No Text on This Page)

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. Each 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, each 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 COMMISSIONNING 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 COMMISSIONNING 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.

Term	**Definition**
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. Each 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 Design Consultant
5) Name of Construction Manager as applicable
6) Date recorded

7) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
8) 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: Each applicable 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: Each Contractor performing Demonstration and Orientation must 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. Each 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. Each 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.
   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 each 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, the applicable Contractor will 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. Each 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 each 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 (USGBC) and administered by the Green Business Certification Inc. (GBCI).
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.

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. Each 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.1through 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 subcontractor'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 x pre-consumer percentage x product value + 1 x post-consumer percentage x product value = 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 each Contractor's or subcontractor'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 ≤ 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 PROCEEDURES.

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 GC 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. Each Contractor must be responsible for the provision, maintenance, and repair of all ESC measures.

c. Demonstration. Each 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. Each 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: Each 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 GC Contractor will be responsible for distributing the EBMCF and any other forms or templates required for each Contractor and subcontractor to record LEED documentation. Each Contractor will be responsible for collecting and compiling EBMCF information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES. The GC Contractor will be responsible for collecting and compiling all completed EBMCF forms and supporting manufacturer's data into one package for LEED submission, and must document each individual LEED credit separately.

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. Each 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 each 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) and administered by the Green Business Certification Inc. (GBCI).
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 regarding 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. 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). 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). C. Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree meter). Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing the corrosion of ferrous metal substrates.
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	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). 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".
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, each Contractor will be responsible for the completion of the Disclosure and Optimization Calculator, which can be found on USGBC's website, and must provide the supporting manufacturer's data. The GC Contractor must collect all Disclosure and Optimization Calculators and maintain one updated Disclosure and Optimization Calculator that includes all applicable products used by each Contractor and subcontractor 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 x pre-consumer percentage x product value + 1 x post-consumer percentage x product value = 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 CO_2e;
      ii. Depletion of the stratospheric ozone layer, in kg CFC-11;
      iii. Acidification of land and water sources, in moles H+ or kg SO_2;
      iv. Eutrophication, in kg nitrogen or kg phosphate;
      v. Formation of tropospheric ozone, in kg NOx 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, each Contractor will be responsible for the completion of the EQ Calculator, which can be found on USGBC's website, and must provide the supporting manufacturer's data. The GC Contractor must collect all EQ Calculators and maintain one updated EQ Calculator throughout the Project duration that includes all applicable products used by each Contractor and subcontractor throughout the Project duration and submit the updated calculator on a monthly basis.

a. The EQ Calculator will 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 bioacculmulative 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 will 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, must 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 subcontractor'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 ≤ 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
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.

C. The GC Contractor must provide a final submission of the Disclosure and Optimization Calculator, the EQ Calculator, and all supporting data in one package for LEED submission, documenting each individual LEED credit separately.

D. If in the Project's LEED review, the USGBC or GBCI, their third party reviewer, requires additional documentation as it relates to the LEED Building Submittals, each Contractor and subcontractor 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, each Contractor must implement the ESC Plan, coordinate the Plan with all affected trades, and the GC Contractor must 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. Each Contractor will be 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. Each Contractor must provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.
   d. All Contractors and subcontractors must promptly notify the ESC Representative if damage to an ESC measure is observed.
   e. Meetings. Urgent or ongoing ESC issues will 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. Each Contractor must save such original documents for the life of the Project plus seven (7) years.

1.9 QUALITY ASSURANCE:

A. Each Contractor must implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and the GC Contractor must 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. Each Contractor must facilitate measurements taken by authorized parties on site for LEED compliance verification purposes.

B. Responsibilities of Contractor's Subcontractors: Each Contractor will be 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 GC Contractor will be 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 other Contractors and subcontractors to record LEED documentation. The GC Contractor will also be 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 will 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 ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating: bifma.org

I. ANSI/BIFMA e3-2011 Furniture Sustainability Standard: bifma.org

J. ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling): www.iso.org

K. ISO 14025–2006, Environmental labels and declarations (Type III Environmental Labeling): www.iso.org

L. ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks: www.iso.org

M. ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines: www.iso.org

N. International Standard ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products: www.iso.org

O. Federal Trade Commission, Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e): www.ftc.gov/bcp/grnrule/guides980427.htm

P. Global Reporting Initiative (GRI) Sustainability Report: www.globalreporting.org/

Q. Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises: www.oecd.org/daf/internationalinvestment/guidelinesformultinationalenterprises/

R. U.N. Global Compact, Communication on Progress: www.unglobalcompact.org/participation/report/cop

S. ISO 26000—2010 Guidance on Social Responsibility: www.iso.org/iso/home/standards/iso26000.htm

T. Forest Stewardship Council: www.ic.fsc.org

U. Sustainable Agriculture Network: www.sanstandards.org

V. The Rainforest Alliance: www.rainforest-alliance.org/

W. ASTM Test Method D6866: www.astm.org/Standards/D6866.htm

X. Chemical Abstracts Service: www.cas.org/

Y. Health Product Declaration: www.hpd-collaborative.org/

Z. Cradle-to-Cradle CertifiedCM Product Standard: www.c2ccertified.org/product_certification

AA. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): www.echa.europa.eu/support/guidance-on-reach-and-clp-implementation

BB. 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 018113.10
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.

Term	Definition
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: Each 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. Each Contractor is responsible for distributing the forms or templates required for the other Contractors and subcontractors to record EPP documentation. Each Contractor is also responsible for collecting and compiling information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.

D. Each 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, each 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:

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	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				
	EPP Book Used	Product Type	Product Details	Product Description	Products Per Unit	Cost Per Unit	Units Purchased	Total Cost	Comments
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. A. Lacquer: Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film. B. Sanding Sealer: A sanding sealer that also meets the definition of a lacquer. C. 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 regarding 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. 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. Each 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 each 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 bioacculmulative 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.

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
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 will 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. Each Contractor must 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

(No Text on This Page)

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.

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 GC 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 GC 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 GC Contractor must distribute copies of the Construction IAQ Management Plan in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

b. Instruction: The GC Contractor must provide on-site instruction of appropriate site management to each Contractor.

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 Contactor'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 GC Contractor will be responsible for preparing and implementing the Construction IAQ Management Plan and must coordinate and incorporate the work of each Contractor in the IAQ Management Plan. Include the Construction IAQ Management Plan requirements in contract agreements with Subcontractors. Familiarize each Contractor and his/her Subcontractors with the Construction IAQ Management Plan and how the Construction IAQ Management Plan will affect their daily activities. Hold an orientation meeting with the other Contractors and Subcontractors to review the Construction IAQ Management Plan requirements.

B. Responsibility of Contractors: Each Contractor for this Project will be responsible for cooperating with the GC Contractor in the preparation and implementation of the Construction IAQ Management Plan.

C. Include construction IAQ progress check-ins as a regular item in weekly Contractor and 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. Each 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. Each 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 applicable 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 Contractor 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 any of the Contractors, 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 definines 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 Contractors' Contracts 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 each 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 each Contractor as applicable 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.

1.5 COMMISSIONING TEAM:

A. Members Appointed by each Contractor: 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 each 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(s) must provide utility services required for the commissioning process.

B. As a member of the Commissioning Team, each Contractor and its Subcontractors must assign representatives with expertise and authority to act on behalf of each 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 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 each 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 applicable 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 each 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:

Each 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 each 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. Each Contractor as applicable 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.

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 each Contractor must ensure that all required Commissioning Team members attend.

C. Construction Documents: Each 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 each Contractor must ensure that all required Commissioning Team members attend.

E. Testing Coordination: Each 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: Each 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 each Contractors' 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 Contractors 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. Each 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. Each 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 applicable Contractor(s) 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: Each 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 Contractors for review and planning activities. Each 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. Each 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 applicable Contractor(s) 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 applicable Contractor(s) 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 applicable 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 applicable 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, the applicable 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 each 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 each 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. Each 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 applicable Contractor.

4. Each 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 each Contractor. Each 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. Each 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. Each 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

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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: **PV669-NPC**

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**
CONTRACT NO. 2	**PLUMBING WORK**
CONTRACT NO. 3	**HVAC + FIRE PROTECTION WORK**
CONTRACT NO. 4	**ELECTRICAL WORK**

Nuyorican Poets Cafe Renovation Rebid

LOCATION: **236 East 3rd Street**
BOROUGH: **Manhattan, NY 10009**
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 _____

FMS ID: **PV669-NPC**

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 and Required for:

CONTRACT NO. 1	**GENERAL CONSTRUCTION WORK**
CONTRACT NO. 2	**PLUMBING WORK**
CONTRACT NO. 3	**HVAC + FIRE PROTECTION WORK**
CONTRACT NO. 4	**ELECTRICAL WORK**

Nuyorican Poets Cafe Renovation

LOCATION: **236 East 3rd Street**
BOROUGH: **Manhattan, NY 10009**
CITY OF NEW YORK

Contractor

Dated _____ , 20____

Approved as to Form
Certified as to Legal Authority

CL 5/3/23

Acting Corporation Counsel

Dated May 3 , 2023

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20____

Department of Design and Construction

PROJECT ID: **PV669-NPC**

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 3 OF 3

ADDENDUM TO THE GENERAL CONDITIONS

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

Nuyorican Poets Cafe Renovation Rebid

LOCATION:	**236 East 3rd Street**
BOROUGH:	**Manhattan, NY 10009**
CITY OF NEW YORK	
CONTRACT NO. 1	**GENERAL CONSTRUCTION WORK**
CONTRACT NO. 2	**PLUMBING WORK**
CONTRACT NO. 3	**HVAC + FIRE PROTECTION WORK**
CONTRACT NO. 4	**ELECTRICAL WORK**

DCLA

Rice+Lipka Architects

Date: **August 4, 2023**

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

ADDENDUM TO THE GENERAL CONDITIONS FOR MULTIPLE CONTRACT PROJECTS

The General Conditions are hereby amended in accordance with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #: PV669-NPC

PROJECT NAME: Nuyorican Poets Cafe Renovation Rebid

PROJECT DESCRIPTION: This Project consists of a renovation and enlargement to the existing building to expand the organization's operations into the 2nd, 3rd and 4th floors of the building, adding a second performance space to the 4th floor. The renovation brings the building up to accessibility and egress standards by adding a new elevator and 2 egress stairs. The demolition scope of the project includes the existing full height south exterior wall, all interior partitions and finishes, and selective cellar slab work for the elevator foundation and plumbing. The new scope includes the rear addition, new roof, sistering the joists at all existing floors, new acoustic floor buildups. The building will be vacated for the duration of the construction, so there are no building opening hours to adhere to and there will be no project phasing.

PROJECT LOCATION: 236 E 3rd St
BOROUGH: Manhattan
CITY OF NEW YORK
ZIP CODE: 10009
COMMUNITY BOARD #: Manhattan CB 03

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

This project must achieve a Silver LEED Green Building Rating. A certain number of credits are required for this rating and are detailed in the Addendum.

Sections 01 7419 Sub-Section 1.5(C) Waste Management Performance Requirements / LEED Certification, 01 8113.03 Sustainable Design Requirements for LEED v3 Buildings, 01 8113.13 VOC Limits for Adhesives, Sealants, Paints and Coatings for LEED v3 Buildings, and 01 8119 Indoor Air Quality Requirements for LEED Buildings of the DDC Standard General Conditions shall apply to this project.

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

[X] 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 separate Contracts pertaining to this Project are set forth below:

Contract No. 1 - Contract for General Construction Work
Contract No. 2 – Contract for Plumbing Work
Contract No. 3 – Contract for Heating, Ventilating, and Air Conditioning and Fire Safety Work
Contract No. 4 – Contract for Electrical 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.

Section	Sub-Section	Sub-Section	Applies		Does not Apply		Applies as Amended
01 1000	1.4 (B)	Scope and Intent / LEED	X				
	1.4(C)	Scope and Intent / Commissioning	X				
01 2200		Expanded Work Allowance	X				
01 3233		Photographic Documentation	X				
01 3300	1.7 (A-E)	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-J)	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					
	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		
	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				

Section	Sub-Section	Sub-Section	Applies		Does not Apply		Applies as Amended
01 5000	3.17(B)	Project Rendering	X				
	3.18 (A-C)	Security Guards / Fire Guards on Site	X				
01 5411	3.1 (A-L)	Temporary Use, Operation and Maintenance of Elevators During Construction for New Buildings Up To and Including 15 Stories			X		
	3.2 (A-O)	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 8113.10		Environmentally Preferrable 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 10 00 SUMMARY: Add the following article:

1.14 BUILDING OCCUPANCY

A. The building will be vacated prior to construction and will be un-occupied during construction of the project.

ADDITIONAL SECTIONS/SUB-SECTIONS

The Contractor is advised that the additional Sub-Sections set forth below are included in the General Conditions and apply to the Project.

Information from Previous Advertisement:

This contract was previously advertised, but bids were not opened. The previous advertisement contained 4 addenda, and these Contract Documents include the addenda revisions in their final form, except as noted below.

(a) Previously answered Pre-Bid Questions (PBQ): The PBQ that were received and answered are included within the PASSPort procurement. PBQs that were solely related to the previous procurement (such as postponement requests) have been redacted to avoid confusion. Please note that many discrepancies identified by PBQ were corrected in subsequent addenda and these revisions are already reflected in the Contract Documents.

For clarity, the PBQ attached are part of the Contract Documents, and are not PBQ as part of this procurement.

Included within the PASSPort procurement are 5 pages of PBQs.

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 shall not be subject to the deletion and/or revision set forth above. Such Special Experience Requirement shall 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 covey 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	CONTRACT #2	CONTRACT #3	CONTRACT #4
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	■ Project Safety Representative □ Dedicated, full-time Project Safety Manager			
Article 14 Contract	Time of Substantial Completion	Consecutive Calendar Days	**720**	**720**	**720**	**720**
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	**$600**	**$600**	**$600**	**$600**
Article 17 Contract	Sub-Contracts	Not to exceed Percent of Contract Price	**60%**	**25%**	**50%**	**25%**
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 $1,000,000			**10%**
Article 24 Contract	Deposit Guarantee	Percent of Contract Price	**1%**	**1%**	**1%**	**1%**
Article 24 Contract	Period of Guarantee		See Schedule B of the Addendum to the General Conditions			
Article 74 Contract	Statement of Work		Addenda, numbered: _____			
Article 75 Contract	Compensation to be Paid to Contractor		Amount for which the Contract was Awarded: _____ _____ Dollars ($_____)			
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
■ Commercial General Liability Art. 22.1.1	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). The minimum limits shall be $1,000,000.00 per occurrence and $2,000,000.00 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. Additional Insureds: 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 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). 3. Nuyorican Poets Cafe

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
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2 ■ Employers' Liability Art. 22.1.2 □ Jones Act Art. 22.1.3 □ U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.3	Workers' Compensation, Employers' Liability, and Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction. **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. Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.
■ Builders' Risk Art. 22.1.4	100 % of total value of **Work** **Contractor** the Named Insured; the **City** both an Additional Insured and one of the loss payees as its interests may appear. 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. Note: Builders Risk Insurance may terminate upon **Substantial Completion** of the **Work** in its entirety.
■ Commercial Auto Liability Art. 22.1.5	$1,000,000.00 per accident combined single limit 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

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
□ 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. _____
□ 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. _____
□ 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. _____
□ 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 □ 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
[OTHER] Art. 22.1.8 □ Collision Liability/Towers Liability	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 □ Railroad Protective Liability _____	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 ■ Asbestos Liability _____	Only required of the Contractor or Subcontractor performing any required asbestos removal. $1,000,000 each occurrence, $2,000,000 aggregate (Combined Single Limit); only required of the Contractor or Subcontractor performing any required asbestos removal. Additional Insureds: 1. City of New York, including its officials and employees, and 2. Nuyorican Poets Cafe

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.

[OTHER] Art. 22.1.8 □ Boiler Insurance_____	 $200,000
[OTHER] Art. 22.1.8 ■ Professional Liability 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.	$1,000,000 per occurrence 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. 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.

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.

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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
06 61 16	Solid Surfacing Fabrications	10 years
07 13 26	Self-Adhering Sheet Waterproofing	10 years
07 19 00	Water Repellents	10 years
07 24 00	Exterior Insulation and Finish Systems	10 years
07 27 00	Air Barriers	5 years
07 42 13	Metal Wall Panels	10 years (Exterior panel finish) 5 years (Wall system)
07 52 13	Atactic-Polypropylene-Modified Bituminous Membrane Roofing	20 years

07 92 00	Joint Sealants	10 years
08 14 16	Flush Wood Doors	10 years
08 41 23	Fire Rated Glass and Framing Systems – Exterior	5 years
08 42 36	Balanced Door Entrances	3 years
08 44 13	Glazed Aluminum Curtain Walls	10 years (doors and frames) 20 years (finish)
08 71 00	Door Hardware	25 years (Surface Closers) 2 years (Locksets) 2 years (Balance of Hardware)
08 80 00	Glazing	5 years (Coated glass) 10 years (Insulating glass) 5 years (laminated glass)
08 90 00	Louvers and Vents	20 years
09 23 13	Acoustical Gypsum Plaster	3 years
09 64 53	Resilient Wood Flooring Assemblies	3 years
10 28 13	Toilet Accessories	15 years (Mirror)
10 82 19	Exterior Sound Screens	10 years
11 40 00	Foodservice Equipment	5-9 years (compressor) 1 year (equipment)
11 61 33	Rigging Systems and Controls	3 years
12 22 00	Curtains and Drapes	25 years
12 24 13	Roller Window Shades	25 years
13 48 00	Sound, Vibration, and Seismic Control	1 year
14 21 00	Electric Traction Elevator	1 year
22 11 23.13	Domestic Water Packaged Booster Pumps	1 year
22 33 00	Electric Domestic Water Heaters	5 years
23 05 29	Hangers and Supports for HVAC Piping and Equipment	1 year
23 05 48.13	Vibration Controls for HVAC	1 year
23 05 53	Identification for HVAC Piping and Equipment	1 year
23 07 00	HVAC Insulation	1 year
23 09 90	Instrumentation and Controls for HVAC	1 year
23 11 23	Facility Natural Gas Piping	1 year
23 23 00	Refrigerant Piping	1 year

23 33 00	Air Duct Accessories	1 year
23 33 53	Duct Liners	1 year
23 34 16	Centrifugal HVAC Fans	1 year
23 37 13	Diffusers, Registers, and Grilles	1 year
23 74 16	Packaged Rooftop Air Conditioning Units	1 year (Parts) 5 years (Energy wheel & drive belt) 10 years (Gas furnace heat exchanger)
23 74 33	Dedicated Outdoor Air Units	1 year (Parts) 10 years (Gas furnace heat exchanger)
23 81 13	Packaged Terminal Air Conditioners - Through Wall Units	2 years (Parts) 5 years (Compressor)
23 81 29	Variable Refrigerant Flow HVAC Systems	1 year 6 years (Compressor)
23 82 33	Convectors	1 year
23 82 39.16	Wall and Ceiling Unit Heaters	1 year
26 09 23	Lighting Control Devices	5 years
26 09 43	Network Lighting Controls	2 years
26 09 61	Theatrical Lighting Controls	3 years
26 33 23	Central Battery Equipment	2 years 14 year prorated
26 43 13	Surge Protective Device for Low-Voltage Electrical Power Circuits	10 years
26 50 00	Lighting - Ballasts	3 years (fixtures 5 years (LED drivers)
27 05 00	Common Work Results for Communications	20 years
28 05 00	Common Work Results for Electronic Safety and Security	1 year
28 46 00	Fire Detection and Alarm	1 year

(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.

CONTRACT #1: GENERAL CONSTRUCTION WORK

T001.00 Title, Dwg Schedule, Key Plans

G001.00 General Notes
G002.00 Symbols, Abbreviations & Mounting Heights
G003.00 Accessibility Diagrams
G004.00 Code Compliance & Life Safety Analysis
G005.00 Code Compliance, Occupancy & Firm Maps
G006.00 Site Survey

Z001.00 Zoning Analysis & Diagrams
Z002.00 Zoning Area Analysis

PA1-001.00 Public Assembly Key Plans, General Notes (PA1)
PA1-101.00 1st Fl & 1st Fl Mezzanine Public Assembly Plans (PA1)
PA1-201.00 1st Fl & 1st Fl Mezzanine Public Assembly Emergency Lighting RCPs (PA1)
PA2-102.00 1st Fl & 1st Fl Mezzanine Public Assembly Plans (PA2)
PA2-202.00 1st Fl & 1st Fl Mezzanine Public Assembly Emergency Lighting RCPs (PA2)
PA3-104.00 1st Fl & 1st Fl Mezzanine Public Assembly Plans (PA3)
PA3-204.00 1st Fl & 1st Fl Mezzanine Public Assembly Emergency Lighting RCPs (PA3)

EN001.00 Energy Code Compliance Analysis: Architectural
EN002.00 Energy Code Compliance Analysis: MEP
EN003.00 Energy Code Compliance Analysis: MEP
EN004.00 Energy Code Compliance Analysis: MEP

H001.00 Asbestos Abatement General Notes
H002.00 Asbestos Abatement Roof Plan
H003.00 Asbestos Abatement South Elevation

DM001.00 Site Demolition Plan
DM100.00 Cellar Demolition Plan & RCP
DM101.00 1st Floor Demolition Plan & RCP
DM101M.00 1st Fl Mezzanine Demolition Plan & RCP
DM102.00 2nd Floor Demolition Plan & RCP
DM103.00 3rd Floor Demolition Plan & RCP
DM104.00 4th Floor Demolition Plan & RCP
DM105.00 Roof Demolition Plan
DM300.00 Demolition Exterior Elevation: North & South
DM301.00 Demolition Exterior Elevation: East
DM302.00 Demolition Exterior Elevation: West
DM400.00 Demolition Bldg Section: North/South

A001.00 Site Plan and Details
A100.00 Cellar Plan & RCP
A101.00 1st Floor Plan & RCP
A101M.00 1st Fl Mezzanine Plan & RCP

A102.00 2nd Floor Plan & RCP
A103.00 3rd Floor Plan & RCP
A104.00 4th Floor Plan & RCP
A105.00 Roof Plans

A121.00 Floor Assembly Key Plan
A221.00 Ceiling Assembly Key Plan
A240.00 Lighting Schedule

A300.00 Exterior Elevation: North & South
A301.00 Exterior Elevation: East
A302.00 Exterior Elevation: West

A400.00 Building Section: North/South
A401.00 Building Sections: East/West
A402.00 Building Sections: East/West
A403.00 Building Sections: East/West

A450.00 Exterior Wall Section: North Façade
A451.00 Exterior Wall Section: South & West Façade
A452.00 Exterior Wall Section: West Façade
A453.00 Exterior Wall Section: South Façade, Stair B

A500.00 Exterior Details: Foundation
A501.00 Exterior Details: Plan Section Details
A502.00 Exterior Details: Window Opening Prep
A520.00 Exterior Details: 1st Floor Storefront
A521.00 Exterior Details: North Façade
A530.00 Exterior Details: Brick
A531.00 Exterior Details
A540.00 Exterior Wall Details
A541.00 Exterior Details: EIFS Details
A542.00 Exterior Details: EIFS Details
A550.00 Exterior Details: Expansion Joints
A551.00 Details: Stair B
A570.00 Exterior Details: Roof
A571.00 Exterior Details: Roof

A600.00 Interior Elevations: Cellar
A601.00 Interior Elevations: 1st Floor
A602.00 Interior Elevations: 2nd Floor
A603.00 Interior Elevations: 3rd Floor
A604.00 Interior Elevations: 4th Floor
A605.00 Interior Elevations: East Elevation
A606.00 Interior Elevations: West Elevation
A607.00 Interior Elevations: Stair A & Stair B

A700.00 Stair A Details: Plans
A701.00 Stair A Details: North/South Sections
A702.00 Stair A Details: East/West Sections
A703.00 Stair B Details: Plans
A704.00 Stair B Details: Sections
A706.00 Stairs Typical: Details
A709.00 Ladders & Exterior Stairs: Typical Details
A710.00 Elevator Details: Plans, Schedule & Section
A711.00 Elevator Details: Plans, Elevation & Section
A720.00 Plumbing Details: Toilet Plans, Elevations & Fixture Schedule
A721.00 Plumbing Details

A740.00 Interior Details: Floor Types
A741.00 Interior Details: Ceiling Types
A742.00 Interior Details: Walls, Soffits and Blackened Steel
A743.00 Interior Details: 4th Floor AV Deck
A744.00 Interior Details: 1st Floor Mezzanine & Pipe Grid
A745.00 Interior Details: Cellar Greenroom & Door 1.05
A746.00 Interior Details: Art Attachments

A800.00 Cellar Finish Plan & RCP
A801.00 1st Floor Finish Plan & RCP
A801M.00 1st Floor Mezzanine Finish Plan & RCP
A802.00 2nd Floor Finish Plan & RCP
A803.00 3rd Floor Finish Plan & RCP
A804.00 4th Floor Finish Plan & RCP
A840.00 Finish Schedule
A850.00 Interior Partition Schedule & Details
A855.00 Exterior Wall Types
A860.00 Door Schedule
A861.00 Door Schedule & Details
A880.00 Window Schedule

A900.00 Cellar, 1st Fl & 1st Fl Mezz Coordinated Device, Furniture & Equipment Plans
A901.00 2nd & 3rd Fl Coordinated Device, Furniture, Furniture & Equipment Plans
A902.00 4th Fl Coordinated Device, Furniture, Furniture & Equipment Plans

A940.00 Millwork: Admin Counter, Desk, Vanity
A941.00 Millwork: Pantry
A942.00 Millwork: Cellar Vanity, Benches & ADA Benches
A943.00 Millwork: Office Desk
A944.00 Millwork: 1st Fl Bar & Backbar Plans & Elevations
A945.00 Millwork: 1st Fl Bar & Backbar Details
A946.00 Millwork: 4th Fl Bar

A980.00 Signage & Graphics: Location Plans
A981.00 Signage &Graphics: Typ. Room Signage
A982.00 Signage & Graphics: Typical Stair
A983.00 Signage &Graphics: Typ. Public Assembly & Elevator
A984.00 Signage &Graphics: Typ. Exterior

TR-01.00 Theatre Rigging 1st & 4th Floor Pipe Grids
VT-100.00 Elevator Layout

FO000.00 Drawing List, Key Plans, and Project Information
FO001.00 General Notes
FO002.00 General Notes, Legend and Load Schedule
FO100.00 Cellar and Foundation Framing Plan
FO301.00 Sections
FO501.00 Typical Details
FO502.00 Typical Details
S000.00 Drawing List, Key Plans, and Project Information
S001.00 General Notes
S002.00 General Notes, Legend and Load Schedule
S003.00 Lateral System Strategy Diagrams Seismic
S004.00 Lateral System Strategy Diagrams Wind
S101.00 First Floor and Mezzanine Framing Plans
S102.00 Second and Third Floor Framing Plans
S103.00 Fourth Floor and Roof Framing Plans
S104.00 Roof Dunnage and Bulkhead Framing Plans

S400.00 Superstructure Sections
S500.00 Typical Details
S501.00 Typical Details
S502.00 Typical Details
S503.00 Typical Details

QF101.00 1st Fl Food Service Equipment Plan & Schedule
QF102.00 1st Fl Food Serv Equipment Mech Spot Connection Plan
QF103.00 1st Fl Food Serv Equipment Elec Spot Connection Plan
QF104.00 1st Fl Food Serv Equipment Special Conditions Plan
QF201.00 4th Fl Food Service Equipment Plan & Schedule
QF202.00 4th Fl Food Serv Equipment Mech. Spot Connection Plan
QF203.00 4th Fl Food Serv Equipment Elec. Spot Connection Plan
QF204.00 4th Fl Food Serv Equipment Special Conditions Plan

CONTRACT #2: PLUMBING WORK

P001.00 Plumbing Legend, Notes, Schedules & Plot Plan
P002.00 Plumbing Schedules
P003.00 Site Plan
P100.00 Cellar Underground Plumbing Plan
P101.00 Cellar & 1st Floor Plumbing Plans
P102.00 1st Floor Mezzanine & 2nd Floor Plumbing Plans
P103.00 3rd Floor & 4th Floor Plumbing Plans
P104.00 Roof and Roof Bulkhead Plumbing Plans
P105.00 Plumbing Demolition Plans and Riser Diagram
P201.00 Storm Water & Sanitary Riser Diagrams
P202.00 Gas and Domestic Water Riser Diagrams
P301.00 Plumbing Details
P302.00 Plumbing Details
P303.00 Plumbing Details

CONTRACT #3: HVAC AND FIRE PROTECTION WORK

M001.00 Mechanical Cover Sheet
M101.00 Mechanical Plan Cellar & 1st Floor
M102.00 Mechanical Plan 1st Mezz & 2nd Floor
M103.00 Mechanical Plan 3rd & 4th Floor
M104.00 Mechanical Roof Plan
M301.00 Mechanical Riser Diagrams
M302.00 Mechanical Riser Diagrams
M401.00 Mechanical Schedules
M501.00 Mechanical Details
M502.00 Mechanical Details
M601.00 Mechanical Details & Control Diagrams

SP001.00 Sprinkler Legend, Notes, Schedules, & Plot Plan
SP101.00 Cellar & 1st Floor Sprinkler Plan
SP102.00 1st Floor Mezzanine & 2nd Floor Sprinkler Plan
SP103.00 3rd Floor & 4th Floor Sprinkler Plan
SP104.00 Roof Sprinkler Plan
SP201.00 Sprinkler Riser Diagram & Details

CONTRACT #4: ELECTRICAL WORK

E001.00	Elec Symbol Lists, Abbreviations & General Notes
E101.00	Cellar Electrical Plan
E102.00	1st Floor & 1st Floor Mezz Electrical Plans
E103.00	2nd Floor & 3rd Floor Electrical Plans
E104.00	4th Floor Electrical Plan
E105.00	Roof Electrical Plan
E201.00	Cellar Lighting Plan
E202.00	1st Floor & 1st Floor Mezz Lighting Plans
E203.00	2nd Floor & 3rd Floor Lighting Plans
E204.00	4th Floor Lighting Plan
E205.00	Lighting Wiring Details
E206.00	Lighting Wiring Details
E207.00	Lighting Wiring Details
E301.00	Electrical Riser Diagram
E401.00	Electrical Schedules
E402.00	Electrical Schedules
E403.00	Electrical Schedules

FA001.00	Fire Alarm Symbols, Notes, Abbreviations & Details
FA101.00	Cellar Fire Alarm Plan
FA102.00	1st Fl & 1st Fl Mezzanine Fire Alarm Plans
FA103.00	2nd Floor & 3rd Floor Fire Alarm Plans
FA104.00	4th Floor & Roof Fire Alarm Plans
FA105.00	Roof Bulkhead Fire Alarm Plan
FA301.00	Fire Alarm Riser Diagram

TA001.00	AV Drawing Index
TA002.00	AV General Notes & Information
TA200.00	AV Cellar Floor Plan & RCP
TA201.00	AV 1st Floor Plan & RCP
TA201M.00	AV 1st Fl Mezzanine Plan & RCP
TA202.00	Av 2nd Floor Plan & RCP
TA203.00	Av 3rd Floor Plan & RCP
TA204.00	Av 4th Floor Plan & RCP
TA601.00	Av Green Room 0003 Enlarged Plan
TA602.00	Av Vestibule 100 Enlarged Plan
TA603.00	Av Entertainment Area 101 Enlarged Plan
TA604.00	Av Entertainment Area 101 Enlarged Plan
TA605.00	Av Audiovisual Av Deck M102 Enlarged Plan
TA606.00	Av Flex Space 201 Enlarged Plan
TA607.00	Av Flex Space 201 Enlarged Plan
TA608.00	Av 3rd Floor Foyer/Hall/Restrooms Enlarged Plan
TA609.00	Av Admin 302/Alcove 302A Enlarged Plan
TA610.00	Av 3rd Fl Green Rm/Dressing/Toilet Enlarged Plan
TA611.00	Av Bar 401/Ent Area 402 Enlarged Plan
TA612.00	Av Bar 401/Ent Area 402 Enlarged Plan
TA701.00	Av Details
TA801.00	AV System Diagrams
TA802.00	AV System Diagrams
TA803.00	AV System Diagrams
TA804.00	AV System Diagrams
TA805.00	AV System Diagrams

TL110.00	Theatrical Lighting Functional Diagram

TL111.00 Theatrical Lighting Functional Diagram
TL120.00 1st Floor Theatrical Lighting Long. Section
TL130.00 1st Floor Theatrical Lighting Circuit Schedule
TL140.00 Theatrical Lighting Control Device Detail
TL150.00 Theatrical Lighting House Control Devices
TL160.00 Theatrical Lighting Equipment Rack Detail
TL161.00 Theatrical Lighting Equipment Rack Detail
TL170.00 Theatrical Lighting Relay & Dimmer Panel Detail
TL180.00 Theatrical Lighting Dimmer Rack Schedule
TL220.00 4th Floor Theatrical Lighting Long. Section
TL230.00 4th Floor Theatrical Lighting Circuit Schedule
TL240.00 4th Floor Theatrical Lighting Control Device Details

TN001.00 Telecom Abbreviations, Legends, Notes & Dwgs List
TN101.00 Telecom Riser Diagrams
TN200.00 Telecom Cellar Floor Plan & RCP
TN201.00 Telecom 1st Fl Plan & RCP
TN201M.00 Telecom 1st Fl Mezzanine Plan & RCP
TN202.00 Telecom 2nd Floor Plan & RCP
TN203.00 Telecom 3rd Floor Plan & RCP
TN204.00 Telecom 4th Floor Plan & RCP
TN601.00 Telecom Room Layout And Elevations
TN701.00 Telecom Installation Details
TN702.00 Telecom Installation Details

TY001.00 Security Abbreviations, Legends, Notes & Dwg List
TY101.00 Security Riser Diagrams
TY200.00 Security Cellar Floor Plan & RCP
TY201.00 Security 1st Floor Plan & RCP
TY201M.00 Security 1st Fl Mezzanine Plan & RCP
TY202.00 Security 2nd Floor Plan & RCP
TY203.00 Security 3rd Floor Plan & RCP
TY204.00 Security 4th Floor Plan & RCP
TY701.00 Security Installation Details

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)
TS Thermal Switch
MS Magnetic Starter
CMS Comb. Mag. Starter
P Pilot Light
F Firestat
T Thermostat
AL Alternator
BG Break Glass Station
HOA Hand-Off Auto.
PB Push Button Station
RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW or MCA	Volts and Phase	Control Type: See legend above	Remarks:
RTU-1	ROOF	1	71.7 A	208V/3PH	CMS	
RTU-2	ROOF	1	44.3 A	208V/3PH	CMS	
RTU-3	ROOF	1	71.7 A	208V/3PH	CMS	
RTU-4	ROOF	1	30.6 A	208V/3PH	CMS	
ACC-1	ROOF	1	16.5 A	208V/1PH	CMS	
ACC-2	ROOF	1	16.5 A	208V/1PH	CMS	
AC-1	CELLAR	1	1.4 A	208V/1PH	DB	
AC-2	3RD FL	1	0.4 A	208V/1PH	DB	
AC-3	3RD FL	1	0.4 A	208V/1PH	DB	
AC-4	3RD FL	1	0.3 A	208V/1PH	DB	
AC-5	2ND FL	1	0.6 A	208V/1PH	DB	
AC-6	2ND FL	1	0.5 A	208V/1PH	DB	
AC-7	EMR	1	11.4 A	208V/1PH	DB	
TX-1	ROOF	1	1/4 HP	208V/1PH	CMS	
TX-2	ROOF	1	1/2 HP	208V/1PH	CMS	
SPF-1	ROOF	1	3/4 HP	208V/1PH	CMS	
EH-1A	CELLAR	1	0.5 KW	208V/1PH	DB	
EH-1C	STAIR A (Bulkhead)	1	0.5 KW	208V/1PH	DB	
EH-1D	STAIR B (4th Floor)	1	0.5 KW	208V/1PH	DB	

EH-2A	1ST FL	1	2.0 KW	208V/1PH	DB	
EH-2B	1ST FL (Stair A)	1	2.0 KW	208V/1PH	DB	
EH-2C	1ST FL (Stair B)	1	2.0 KW	208V/1PH	DB	
EH-2D	1ST FL (Stair B)	1	2.0 KW	208V/1PH	DB	
WH-1	CELLAR	1	18 KW	208V/3PH	DB	
WH-2	CELLAR	5	4.1 KW	208V/1PH	DB	
WH-3	CELLAR	1	8.3 KW	208V/1PH	DB	
SP-1	CELLAR	1	1/2 HP	208V/1PH	HOA	
WB-1	CELLAR	1	3.0 HP	208V/3PH	CMS	
SE-1	CELLAR	1	1.5 HP	208V/3PH	CMS	
CP-1	CELLAR	1	1/12 HP	115V/1PH	HOA	
FP-1	CELLAR	1	25 HP	208V/3PH	CMS	
JP-1	CELLAR	1	0.75 HP	115V/1PH	HOA	

SCHEDULE E

Separation of Trades

(Reference: 01 1000, Article 1.6 (A) of the DDC Standard General Conditions)

Requirements for various items of work are included in the Specifications for the separate Contracts for the Project and in the General Conditions. Schedule E set forth below delineates the responsibilities of each separate Contractor for various items of work, as well as the extent to which certain items involve coordination between trades. The delineation set forth in this Schedule E shall be taken as specific instruction to the Contractor that it is responsible for the listed items of work. Schedule E is not intended to limit the Contractor's responsibility for supervision and coordination. In the event of any conflict between the Specifications, the General Conditions and this Schedule E, Schedule E shall take precedence; provided, however, in the event of an omission from Schedule E (i.e., Schedule E omits either a reference to or information concerning an item of work which is set forth in the Specifications or the General Conditions), such omission from Schedule E shall have no effect and the Contractor's obligation to perform the work, as set forth in the Specifications or the General Conditions, shall remain in full force and effect.

Legend: "F" = Furnished "I" = Installed "P" = Provided (Furnished and Installed)
Contractor designation (#1, #2, #3 and #4) is as indicated in Section II of this Addendum.

ITEM	Contr # 1	Contr # 2	Contr # 3	Contr # 4	Notes
Temporary Heat	P	P	P	P	
Temporary Water		P			
Temporary Light and Power				P	
Temporary Toilets – Enclosures	P				
Temporary Toilets – Fixtures	P				
Rubbish removal from project site	P				
Hoisting and Rigging	P				

ITEM	Contr # 1	Contr # 2	Contr # 3	Contr # 4	Notes
Excavation and Backfill	P				
Utility Trenches – inside building	P				
Utility Trenches – outside building	P				
Keeping site, excavations, and building, free from water during construction	P				
Access doors in finished walls and ceilings, panels and ceilings, panels and supporting frames	P				
Field touch-up painting of damaged shop coats	P				
Prime coating hangers and supports	P				
Rust proofing field cut and assemble iron supporting frames and racks	P				
Finished painting of exposed equipment or piping or ductwork on walls and ceilings where adjacent surfaces are painted	P				
Concrete foundations, housekeeping pads or bases for floor mounted equipment not indicated on the contract drawings	P				
Concrete foundations pads and bases, as indicated on contract drawings, for floor mounted equipment	P				
Framed slots and openings in walls, decks, slabs and/or precast concrete planks	P				

ITEM	Contr # 1	Contr # 2	Contr # 3	Contr # 4	Notes
Sleeves and core drilling thru slabs, decks and walls whether waterproofed or not	P				
Waterproof sealing of pipes passing thru sleeves and/or slots		P		P	
Waterproof sealing of sleeves thru membraned and waterproofed slabs, roofs, and decks		P		P	
Sleeves thru walls with no core drilling required	P				
Roof openings	P				
Louvers – exterior	P				
Louvers – interior	P				
Roof curbs and roof equipment supports	P				
Steel Dunnage and Platform	P				
Acoustic Barrier Fence	P				
Pitch pockets	P				
Roof cap flashing for all supports, penetrations and roof curbs	P				
Fireproof sealing of slab openings at duct or pipe shafts	P				
Fire extinguishers	P				
Domestic make-up water piping for heating and air conditioning systems		P			

ITEM	Contr # 1	Contr # 2	Contr # 3	Contr # 4	Notes
Pit frames and covers	P				
Gas service piping to gas fired equipment.		P			Refer to Section 231123
Bathroom accessories	P				
Precast and/or molded receptors (mop basins, shower bases, etc.)	I			F	
Sprinkler water service from street main including meter, to capped OS&Y valve connection inside building		P			
Sprinkler Booster Pump			P		
Electric Domestic Water Heaters		P			
Power Wiring for Electric Domestic Water Heater				P	
Power Wiring for Bathroom Hand Dryers				P	
Motors for mechanical equipment			P		
Convector enclosures	P				
Electric duct heaters (heaters installed in air ducts) and electric unit heaters and trench heater.			P		
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Fire and smoke dampers with motors				P	
Control Wiring – General Construction	P				
Control Wiring – Plumbing			P		
Control Wiring – Sprinkler			P		
Control Wiring – HVAC for temperature control			P		
Power Wiring for BMS – Controllers and Devices				P	

ITEM	Contr # 1	Contr # 2	Contr # 3	Contr # 4	Notes
Door Monitoring Systems – Control Wiring				P	
Motor starters and motor controls for equipment requiring power wiring			P		
Power wiring for motorized equipment and motor controls				P	
Electric Power for Flushometers				P	
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Electric power for plumbing system pumps				P	
Concrete encasement of conduits	P				
Electric manholes and handholes	P				
Opening frames for ceiling recessed lighting fixtures and other electrical items	P				

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Nuyorican Poets Café Renovation Geotechnical Memorandum

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CONTRACT # 1

GENERAL CONSTRUCTION WORK

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SECTION 01 21 00 - ALLOWANCE FOR FURNITURE, FIXTURES AND EQUIPMENT (FF&E)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Documents, (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 governing allowances.

B. Related Requirements:

1. DDC General Conditions, Section 017300 "Execution."

C. Except for furniture, fixtures, and equipment ("FF&E") identified in the FF&E Schedule in Section 2.A below, the Contractor must furnish, pay for and install all other FF&E, if any, required for the Project as part of its Contract Price bid by the Contractor for this Project. Any required FF&E not specified in the FF&E Schedule is deemed included as part of the base contract.

1.3 DEFINITIONS

A. CFIO = Contractor Furnished, Installed by Others, compensable through this Allowance. This category includes movable (non-securely attached) items.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with Commissioner.

1.5 SELECTION AND PROCUREMENT

A. Coordination
1. The FF&E Schedule included with this specification provides a general high-level overview of the type of CFIO that is to be provided by the Contractor and that will be payable under this Allowance. No later than nine months prior to the scheduled Substantial Completion of the Project, the Commissioner will provide a more detailed and updated FF&E Schedule.
2. Upon receipt of the updated FF&E Schedule from the Commissioner, the Contractor must promptly (but no later than two weeks from the receipt of the updated FF&E Schedule) identify, itemize, and select all CFIO FF&E based on the FF&E Schedule.
3. After submission of Contractor's proposed itemized list of CFIO FF&E, the Commissioner and the Contractor will promptly meet to:

a. Obtain Commissioner's approval (in the Commissioner's sole discretion) of such list of CFIO FF&E, and
b. Plan and schedule for the Contractor's procurement, acquisition, delivery, and assembly of each CFIO item (an "FF&E Plan").

B. Finalization of the CFIO FF&E List
1. The Parties will finalize the FF&E Plan no later than six months prior to the scheduled Substantial Completion date. The Contractor will be responsible for the procurement of the FF&E approved by the DDC under the FF&E Plan. The Contractor will be responsible for accepting delivery of all CFIO FF&E and for the proper placement of such items as directed. CFIO FF&E will be located as directed by DDC.

C. Procurement of CFIO FF&E
1. Unless otherwise directed, Contractor must seek a minimum of three (3) competitive bids or price quotations for the CFIO FF&E, including delivery. At least one of the provided quotations must reflect the basis of design product and manufacturer. Where three (3) bids or quotations are unavailable, such as where there is only one manufacturer or retailer for the item, the Contractor may apply to Commissioner for a waiver of this requirement. The Commissioner will promptly provide direction on how to proceed.
2. All prices for CFIO items are subject to the Commissioner's approval, which must be received prior to the Contractor's purchase of any CFIO items. The Contractor must submit copies of all bids and quotes for CFIO items to the Commissioner.

1.6 SUBMITTAL PROCEDURES:

A. Refer to DDC General Conditions Section 013300 "Submittal Procedures."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Coordination and Delivery:

1. Be responsible for coordinating with the Commissioner to accept delivery of all CFIO items.
2. Delivery of all items is restricted to regular business hours unless otherwise directed by the Commissioner. Any additional costs to be borne by the Contractor for deliveries outside of normal business hours must be expressly approved by the Commissioner in writing prior to commencement of the delivery.
3. Provide to the Commissioner a log and record of all items received. Records to include invoice, delivery confirmation, and a complete receiving report.
4. Be responsible, under the direct supervision of the Commissioner, for safely and securely receiving and storing all CFIO items and protecting them from any damage until installed.
5. Be responsible, under the direct supervision of the Commissioner, for protecting CFIO items from theft and/or any damage after installation until the City of New York either takes full occupancy of the building or provides written acceptance of the CFIO items, whichever comes first.

1.8 FIELD CONDITIONS

A. Environmental Conditions: Do not deliver or install CFIO items until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install CFIO items that are wet, moisture damaged, mold damaged, or otherwise damaged or malfunctional in any way.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.9 ALLOWANCE

A. Allowance shall include cost to Contractor of specific products and materials selected by Commissioner under the Allowance and shall include delivery fees or manufacturer installation, if required, and product warranties, as applicable and paid by Contractor. Submit additional proof of payment, such as canceled checks or copies of wire transfer receipts, to Commissioner upon request.

B. Overhead, including, without limitation, incidental costs to select and procure CFIO items and personnel time performing related tasks, anticipated profit, and similar costs related to products and materials selected by Commissioner under the Allowance shall be included as part of the Contract Price bid by the Contractor for the Project and not part of the Allowance.

PART 2 - PRODUCTS

2.1 CFIO EQUIPMENT

A. FF&E Schedule:

ITEM
Kitchen Equipment
Bar Equipment (Beer Cooler)
Trash Containers
Refrigerated cabinets
Furnishings & Appliances
Lockers
Chairs

Tables
Office Accessories
Air Purifiers
Office storage
Workstations
Conference Table
Theatrical Lighting Equipment
Cables
Lighting instruments
Lighting accessories
Lighting console
Monitor mounting arms
Lighting console monitors, power, USB and video cables
Communications
Office phones
Desktop computer, accessories, and monitors
Audio Visual Equipment
Audio Equipment: Amplifiers, speakers, microphones, mixers, control equipment
Visual Equipment: Video monitors, projectors, cameras, control equipment

PART 3- EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

END OF SECTION 012100

SECTION 02 41 19 - SELECTIVE 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. Alterations, selective demolition and removals as noted on drawings and as required to accommodate new construction.

2. Removal of debris.

3. Protection of existing building and spaces to remain and shoring of the structure as required for structural integrity and personal safety.

4. Protection of existing curbs and sidewalks.

5. Temporary coverage passageways.

6. Alterations, selective demolition and removals of exterior facade where noted.

7. Patching and refinishing of existing surfaces damaged as a result of this work.

8. Protection.

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Assurance".

B. The Contractor shall be responsible for any damage to any adjacent structures or buildings to remain.

C. Qualifications: Qualifications of Contractor for work of this Section shall not be less than three (3) years of field experience.

D. Professional Engineering: Retain the services of a Professional Engineer licensed in the State of New York to engineer and supervise installation of all underpinning and shoring.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Schedule of Demolition Operations: Submit demolition procedures and operational sequence for Commissioner's review prior to start of work. Submit a written request to Commissioner well in advance of executing any cutting or alteration which affects:

1. The work of tying in or connecting to operational systems of the building, including electrical, mechanical and security systems.

2. The work of the City of New York or any separate Contractor.

3. The structural value or integrity of any element of the project or of adjacent structures.

4. The integrity or effectiveness of weather-exposed and moisture-resistant elements or systems.

5. The efficiency, operational life, maintenance, or safety of operational elements or systems.

C. Shop Drawings: Submit the following prior to starting work:

1. Submit for Commissioner's information shop drawings indicating location and typical construction details of temporary dustproof and weatherproof partitions.

2. Submit drawings of temporary structural shoring, bracing, framing or support, for the information of the Commissioner. Such drawings will be reviewed by the Commissioner for the effects of such temporary members on the structural elements to remain. These drawings shall include the reason for such temporary members, the location, the direction and magnitude of design reaction forces on existing structure, and details showing how these reaction forces will be applied to the existing structure.

a. Submit shop drawings signed and sealed by the Contractor’s Professional Engineer licensed in the State of New York.
b. The Commissioner will receive acknowledgment for concepts shown. Such acknowledgments shall be of the concept only and not of actual capacities or structural design and shall not in any way diminish or limit the Contractor's responsibility for the quality and performance of the work and for protecting existing structures and facilities.

1.5 JOB CONDITIONS

A. Areas of building to be demolished or altered will be vacated and discontinued in use prior to the start of the work.

B. Partial Removal

1. Items of savable 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.

C. Explosives: The use of explosives will not be permitted.

D. Traffic: Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Commissioner. Provide alternate routes around closed or obstructed traffic ways if required by the New York City Department of Transportation.

E. 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 the Commissioner. Provide temporary services during interruptions to existing utilities, as acceptable to ConEdison and the Commissioner.

3. Disconnect and seal any abandoned utilities before starting demolition operations. Coordinate all work with ConEdison.

1.6 SCHEDULING

A. Before commencing any alteration or demolition work submit, for review and approval by the Commissioner, a schedule showing the commencement, the order, and the completion dates for the various parts of this work.

B. Before starting any work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the structures to remain, notify the Commissioner 7 days in advance and obtain the Commissioner's approval in writing before proceeding with this phase of the work.

PART 2 - PRODUCTS

Refer to Part 3 - Execution, for Product Requirements

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PROTECTION BY CONTRACTOR

A. Execute demolition work to ensure protection of existing portions of building to remain against damages which might occur from falling debris or other cause. Do not interfere with use of adjacent occupied buildings and areas. Maintain free, safe passage to and from adjacent occupied buildings.

B. Materials Placement: Do not load structure with weight that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.

C. Construction Operations: Do not employ any construction operation, equipment or vehicles that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.

D. Take precautions to guard against movement, settlement, damage, or collapse of any part of building, sidewalks, adjacent property or street passages; be liable for any such movement, settlement or collapse.

E. Provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays, and holidays.

F. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.

G. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent any damage to existing construction.

1. Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor's Professional Engineer licensed in the State of New York shall advise on bracing, shoring, underpinning, or other structural requirements. The Contractor shall bear all responsibility for prevention of movement or other structural fault.

2. The Contractor shall restore, by repair or otherwise, the portions of structure or their contents altered by the Contractor in furtherance of underpinning and support operations. Restoration shall be completed to the conditions which existed prior to the start of the work. Restore any damage caused by inadequate support.

H. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the workers engaged in demolition and alteration operations, occupants of the building, public and adjacent property. Repair any damage caused by the Contractor's operations.

I. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work are being done, connections made, materials handled, or equipment moved.

J. Take necessary precautions to prevent dust and dirt from rising. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.

K. Do not close or obstruct walkways, passageways, or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.

L. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

M. Promptly repair damages caused to adjacent facilities by demolition operations.

N. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

3.3 INSPECTION

A. Verify that areas of demolition work are protected, and temporary dustproof partitions have been installed.

B. Verify that construction to be removed is not load bearing or has been properly braced, framed or supported.

C. Inspect existing conditions of the project, including elements subject to damage or to movement during demolition and cutting.

D. After uncovering work, inspect the conditions affecting the installation or performance of the work.

1. Report differing or questionable conditions to the Commissioner in writing; do not proceed with the work until the Commissioner has provided further direction.

3.4 PREPARATION

A. Provide adequate temporary support as necessary to ensure the structural value or integrity of the affected portion of the work

B. Provide devices and methods to protect and monitor other portions of the project from damage.

C. 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.

3.5 DEMOLITION AND CUTTING

A. Selectively demolish existing construction in conformance with the drawings and these specifications.

1. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surface to receive installation of work and patching of finish surfaces.

2. Do all cutting or removal so as to leave neat, true, plumb and square edges, at edges to remain. Use carborundum or diamond saw equipment for cutting masonry, concrete and stone work, where edges or surfaces are to remain.

3. Do not cut or remove construction which might weaken or impair the structural integrity or strength of the structural framing or support systems which are to remain.

4. Demolish and remove materials as shown on the drawings without damage to the remaining parts of the structure or mechanical/electrical/utility systems.

5. Remove materials so as to not impose excessive loads in supporting walls, floors or framing and so as not to damage remaining undemolished portions of the structure.

6. Where portions of structures are to be removed, remaining portions shall be protected from damage and prepared to fit new construction. Damage to portions of structures to remain shall be repaired.

7. Reinforcing steel in existing structures shall be left in place, cleaned and aligned to provide tie with new work.

8. Existing waterproofing systems and flashings shall be carefully exposed and protected to maintain workable conditions of fitting new work with existing construction.

9. Proceed with demolition in a systematic manner.

10. Demolish concrete and masonry in small sections.

11. Demolish masonry work immediately adjacent to and abutting historic masonry utilizing hand tools only.

B. Shoring

1. Design, provide, erect and maintain necessary temporary shoring, bracing, framing, or support where load bearing structural or supporting members are removed or weakened by cuts or openings or are subject to damage from demolition operations, and otherwise as required for safety or to protect finish surfaces from damage.

2. Construction and adequacy of the shoring shall be the entire responsibility of the Contractor. Any damage caused by the inadequacy of the shoring or other support shall be the responsibility of the Contractor to remedy at no additional expense to the City of New York.

3. Shoring and bracing shall remain until new structural framing and/or supports are installed. Coordinate operations fully with other trades.

4. Be ready at any time to promptly provide, add to, or strengthen temporary shoring, bracing, or support for existing work, in case existing construction begins to show signs of structural stress.

3.6 WORKMANSHIP STANDARDS FOR ALTERATION AND REMOVAL WORK

A. Cut, remove, alter, temporarily remove and replace, or relocate existing work as required for performance of the work. Perform such work required with due care, including shoring and bracing.

B. Coordinate patching involving the various trades whether or not specifically mentioned in the respective specification Sections.

C. Materials or items demolished and not designated to become the property of the City of New York or to be reinstalled shall become the property of the Contractor and shall be removed from the site.

D. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the adjacent buildings.

E. In general, demolish masonry in small sections. Where necessary to prevent collapse of any construction, install temporary shores, struts, or bracing.

F. Materials to be removed by existing elevators shall be put in enclosed containers.

G. Where existing equipment and/or fixtures are indicated to be reused, repair such equipment and/or fixtures and refinish to put in perfect working order. Refinish as directed.

H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

I. Where utilities are removed, relocated or abandoned, cap, valve, plug, or by-pass to make complete and working installation.

J. Restore existing pipe and duct coverings damaged by work under this Contract to original undamaged condition.

K. Immediately restore to service and repair any damage caused by Contractor's workers to existing pipe and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems which are not scheduled for discontinuance or abandonment.

L. Upon completion of contract, deliver work complete. Damage that may be caused by Contractor or Contractor's workers to existing structures designated to remain, grounds, and utilities must be restored by Contractor and left in as good condition as existed prior to damaging.

M. Restore finish work of floors, walls, and ceilings remaining in place but damaged or defaced because of demolition or alteration work to condition equal that which existed at beginning of work under this Contract.

N. Where alteration or removals expose damaged or unfinished surfaces or materials, refinish such surfaces or materials, or remove them and provide new or salvaged materials to make continuous surfaces uniform.

O. Perform new work and restore and refinish existing work in conformance with applicable requirements of the specifications, except as follows:

1. Materials for use in repair of existing surfaces, but not otherwise specified, shall conform to the highest standards of the trade involved, and be in accordance with approved industry standards, and shall be as required to match existing surfaces.

2. Workmanship for repair of existing materials shall, unless otherwise specified, be equal to similar workmanship existing in or adjacent to the space where the work is being done.

3. Installation of salvaged items where no similar items exist shall be done in accordance with the highest standards of the trade involved and in accordance with approved shop drawings.

P. Materials or items designated to become the property of the City of New York are shown on the drawings. Remove such items with care and store them in a location at the site to be designated by the Commissioner.

Q. Materials or items designated to be reinstalled are shown on the drawings. Remove such items with care under the supervision of the trade responsible for reinstallation; protect and store until required. Replace materials or items damaged in their removal with similar new material.

R. The existing building shall not be used as a work shop. Neither shall the furnishings or equipment in any room be used as work benches. Should any damage occur during the progress of the work to any furniture, fixtures, equipment, or appurtenances therein, such damage shall be repaired, replaced or made good by the Contractor.

S. Where removing existing floor finish and base, remove all adhesive and leave floors and walls smooth and flush, ready to receive new finish.

T. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

END OF SECTION 02 41 19

SECTION 02 80 13 – 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 (cumingtonite-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 then 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"	l4”	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 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = 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 02 82 13
NOVEMBER 2017 VERSION

ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contract Documents are as defined in the "Agreement". The General Conditions shall apply to all Work of this Section.

B. Work specified herein shall be the removal and disposal of Asbestos-Containing Materials (ACM) and asbestos-contaminated materials from designated areas of the Nuyorican Poets Cafe, located at 236 East 3rd Street, New York, NY 10009.

C. The following documents were reviewed and utilized to generate this abatement design specification which serves to locate and quantify the amount of ACM, and asbestos contaminated material, to be abated in support of this project.

1. A set of drawings (DOB Set) labeled "Nuyorican Poets Café Renovation," dated 05/21/19, prepared by Rice + Lipka Architects;
2. Asbestos Survey Report performed by WSP title "Nuyorican Poets Café: Renovation", dated 07/09/19.

D. The phasing and scheduling of work for this project shall be coordinated with and approved by the Construction Project Manager and Facility Manager. The Construction Project Manager and Facility Manager will make the final determination on all issues under this Contract covered by this Specification.

1.02 SCOPE OF WORK

A. The asbestos abatement contractor is to provide all labor, materials, equipment, services, testing, appurtenances, permits and agreements necessary to perform the work required for the abatement of ACM as required by these contract documents. All work shall be performed in accordance with this Specification, EPA regulations, OSHA regulations, New York City Local Law 70, Title 15, Chapter 1 RCNY, New York State Industrial Code 56, NIOSH recommendations, and any other applicable federal, state or local government regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

B. The intent of this Specification section is to ensure that the asbestos abatement contractor is responsible for the following:

1. Abatement of all ACM.

2. Cleaning and decontamination of the entire affected area.

3. Demolition that may be required to access ACM in each area, Asbestos abatement contractor shall dispose of all debris associated with demolition activities as ACM waste.

4. Removal and disposal of all ACM found within these areas such as tar on wall (black), parapet base flashing (black), tar vapor barrier (black) and contaminated roof insulation (brown), roof membrane (black), membrane/tar over fiberglass duct insulation (black) and exterior waterproofing behind stucco.

5. Provide all scaffolding, platform installation, equipment, tools, transportation and any other equipment required and/or necessary to complete all work described in the Contract Documents.

6. The asbestos abatement contractor shall be responsible for and shall include any and all fees or changes imposed by Local, State or Federal Law, Rule or Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the work.

7. Prior to destructive demolition activities, the DDC may elect to collect bulk samples of assumed asbestos-containing materials and analyze the bulk samples for asbestos content.

C. The asbestos abatement contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. Asbestos abatement contractor is responsible for the confirmation of the actual total quantities of the Work.

1. Drawing H002.00: Roof Plan

a. Remove and dispose of asbestos-containing tar on wall (black), tar vapor barrier (black) and contaminated roof insulation (brown) and roof membrane (black) within **Work Area 1.** Asbestos-containing exterior tar on wall (black) shall be removed utilizing NYCDEP Title 15, Chapter 1 § 1-109 Abatement from Vertical Exterior Surfaces. Asbestos-containing tar vapor barrier (black) and contaminated roof insulation (brown) and roof membrane (black) shall be removed utilizing NYCDEP Title 15, Chapter 1 § 1-107 Foam Procedure for Roof Removal. The asbestos abatement contractor shall be responsible for the removal and disposal of all roofing components down to the substrate/deck.

b. Remove and dispose of asbestos-containing parapet base flashing (black), tar vapor barrier (black) and contaminated roof insulation (brown) and roof membrane (black) within **Work Area 2.** Asbestos-containing parapet base flashing (black), tar vapor barrier (black) and contaminated roof insulation (brown) and roof membrane (black) shall be removed utilizing NYCDEP Title 15, Chapter 1 § 1-107 Foam Procedure for Roof Removal. The asbestos abatement contractor shall be responsible for the removal and disposal of all roofing components down to the substrate/deck.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
1	NYC DEP Section § 1-109 Abatement from Vertical Exterior Surfaces	30 Sq. Ft. of Tar on Wall (Black)	–
	NYCDEP Section § 1-107 Foam Procedure for Roof Removal	1,000 Sq. Ft. of Tar vapor Barrier (Black) and Contaminated Roof Insulation (Brown) and Roof Membrane (Black)	–
2	NYCDEP Section § 1-107 Foam Procedure for Roof Removal	700 Sq. Ft. of Tar vapor Barrier (Black) and Contaminated Roof Insulation (Brown) and Roof Membrane (Black)	–
		100 Sq. Ft. of Parapet Base Flashing (Black)	–

2. Drawing H002.00: South Elevation

a. Remove and dispose of asbestos-containing membrane/tar over fiberglass duct insulation (black) and assumed asbestos-containing exterior waterproofing behind stucco within **Work Area 3.** Asbestos-containing membrane/tar over fiberglass duct insulation (black) and assumed asbestos-containing exterior waterproofing behind stucco shall be removed utilizing NYCDEP Title 15, Chapter 1 § 1-109 Abatement from Vertical Exterior Surfaces.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
3	NYC DEP Section § 1-109 Abatement from Vertical Exterior Surfaces	500 Sq. Ft. Membrane/Tar over Fiberglass Duct Insulation (Black)	–
		900 Sq. Ft. of Exterior Waterproofing behind Stucco (Assumed ACM)	–

D. The facility is under the jurisdiction of NYC Department of Cultural Affairs. The asbestos abatement contractor shall perform the work of this contract in a manner that will be least disruptive to the normal use of the building.

E. Asbestos abatement contractor's attention is directed to the fact that patents cover certain methods of asbestos abatement indicated in the specifications. To date, patents have been issued with regard to negative pressure enclosures or negative or reduced pressure and glove-bag.

F. Asbestos abatement contractor shall be solely responsible for and shall hold the City of New York Department of Design and Construction and the City harmless from, any and all damages, losses and expenses resulting from any infringement by Asbestos abatement contractor of any patent, including but not limited to the patents described above, used by Asbestos abatement contractor during performance of this agreement.

G. Prior to starting, the asbestos abatement contractor must notify the Commissioner of the City of New York Department of Design and Construction if he anticipates any difficulty in performing the work as directed and required by these Specifications. Asbestos abatement contractor shall be required to attend an on-site job meeting with the Construction Project Manager prior to start of work to examine conditions of the site for removal and plan the sequence for removal operations.

H. The asbestos abatement contractor shall retain a certified Project Designer for the preparation of an Asbestos Variance Application (ACP-9), if required.

I. The asbestos abatement contractor shall be responsible for preparing and submitting all filings, notifications, amendments and variances, etc. required by all City, State and Federal regulatory agencies having jurisdiction, at no additional cost to the NYC DDC.

J. The general contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to prepare a Work Place Safety Plan (WPSP), if required.

K. The general contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to perform final inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required under Chapter 17 of the Building Code. Such special inspections and A-TR1 forms shall be completed by the Registered Design professional.

L. For coordination with other Asbestos abatement contractors, see the General Conditions governing all Contracts.

M. Related Asbestos Removal Work Under Other Contracts:

1. Each asbestos abatement contractor shall be responsible for the removal of incidental asbestos not identified in this section and found prior to or during the Work.

2. Incidental asbestos is defined as ACM that is discovered during the course of their work that must be abated to enable them to perform the work of their Contract.

N. Work Hours:

1. The asbestos abatement contractor shall establish his work schedule in a way that avoids interference or conflict with the normal functioning of the facility. Work in the evenings shall be done at no additional cost to the City.

2. All work shall be done during regular working hours unless the Asbestos abatement contractor requests authorization to work other than regular working hours and such authorization is granted by the Commissioner (Regular working hours are those during which any given facility in which work is to be done is customarily open and functioning). If such work schedule is authorized by the Commissioner the work shall be done at no additional cost to the City.

3. The order of phases and start dates associated with each will be determined by the Construction Project Manager.

4. Asbestos abatement contractor shall be required to schedule waste transfer during evening hours, when activity within the facility is at a minimum. Evening hours are defined as 6:00 p.m. to 6:00 a.m. Waste transfer must be approved by the Construction Project Manager and Facility Manager.

O. The following conditions shall apply to all temporary shutdowns of existing services:

1. All temporary lighting and temporary electrical services for use in the Work Area shall be in weatherproof enclosures and be ground fault protected and:

a. Shall be performed at no additional charge to the City.

2. Shall be performed at times not interfering with the other activities in the building.

3. Shall be performed only with written consent from the Commissioner and the Facility Manager.

4. Shall be made through written request to the Commissioner at least 10 days in advance with complete written description of the work to be performed.

P. Stages of Asbestos Removal Work:

1. The asbestos abatement contractor will be required to perform the work and it is the intent of this Specification to remove all asbestos containing and asbestos contaminated materials from the Work Area. The asbestos abatement contractor is responsible for verifying all quantities of materials listed.

Q. Certain equipment in the Work Area may need to remain operational during removal. Therefore, the removal of ACM from this equipment shall be performed as the last removal activities within the Work Area. The Asbestos abatement contractor shall coordinate the scheduling for the removal of ACM on functioning equipment with the Construction Project Manager.

1.03 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.

1.04 WORK BY OTHERS

The City reserves the right during the term of this Contract to have work performed on asbestos abatement projects by other asbestos abatement contractors as the situation warrants.

1.05 DEFINITIONS

A. General Explanation: Certain terms used in this Specification Section are defined below. Definitions and explanations of this Specification Section are not necessarily complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents.

B. Definitions in General Use:

1. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Asbestos abatement contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in Contract Documents. In no case will "approval" by Engineer be interpreted as a release of Asbestos abatement contractor from responsibilities to fulfill requirements of Contract Documents.

2. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Engineer," "requested by Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Asbestos abatement contractor's responsibility for construction supervision.

3. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

4. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

5. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

6. Installer: The term "installer" is defined as the entity (person or firm) engaged by the asbestos abatement contractor, or its sub-asbestos abatement contractor for performance of a particular unit of work at Project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

7. Provide: Except as otherwise defined in greater detail, term “provide” means furnish and install, complete and ready for intended use, as applicable in each instance.

8. Third-Party Air Monitor: The term “Third-Party Air Monitor” is defined as an entity engaged by City and Construction Project Manager to perform specific inspections or tests of the work, either at Project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

C. Definitions Relative to Asbestos Abatement:

1. Abatement: Any and all procedures physically taken to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure, cleanup and repair.

2. Adequately Wet: The complete penetration of a material with amended water to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not evidence of being adequately wet. ACM must be fully penetrated with the wetting agent in order to be considered adequately wet. If the ACM being abated is resistant to amended water penetration, wetting agent shall be applied to the material prior to and during removal as necessary to minimize fiber release.

3. Aggressive Sampling: Method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

4. AHERA: Asbestos Hazard Emergency Response Act of 1986

5. AIHA: American Industrial Hygiene Association.

6. Airlock: System for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

7. Air Sampling: Process of measuring the fiber content of a known volume of air collected during a specific period. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400, or the provisional transmission electron microscopy methods developed by the US EPA which is utilized for lower detection levels and specific fiber identification.

8. Ambient Air Monitoring: “Ambient air monitoring” shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the worksite.

9. Amended Water: Water to which a surfactant has been added.

10. ANSI: American National Standards Institute

11. Area Air Sampling: Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

12. Asbestos: Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

13. Asbestos-Containing Material (ACM): Asbestos or any material containing more than one-percent asbestos.

14. Asbestos-Containing Waste Material: ACM, asbestos-contaminated objects or debris associated with asbestos abatement requiring disposal.

15. Asbestos-Contaminated Objects: Any objects which have been contaminated by asbestos or asbestos-containing material.

16. Asbestos Assessment Report: "Asbestos Assessment Report" shall mean the "Form ACP-5" form, as approved by NYCDEP, by which a NYCDEP-certified asbestos investigator certifies that a building or structure (or portion thereof) is free of ACM or the amount of ACM to be abated constitutes a minor project.

17. Asbestos Handler: Individual who disturbs, removes, repairs, or encloses asbestos material. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

18. Asbestos Handler Supervisor: Individual who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures as well as individual safety procedures are being adhered to. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

19. Asbestos Investigator: An individual certified by NYCDEP as having successfully demonstrated his or her ability to identify the presence of and evaluate the condition of asbestos in a building or structure.

20. Asbestos Project: Any form of work performed in a building or structure which will disturb (e.g., remove, enclose, encapsulate) asbestos-containing material.

21. ASTM: American Society for Testing and Materials.

22. Asbestos Project Notification: The "Form ACP-7" asbestos project notification form as approved by DEP.

23. Authorized Visitor: Authorized visitor shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.

24. Building Owner: Person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

25. Building Materials: Any and all manmade materials, including but not limited to interior and exterior finishes, equipment, bricks, mortar, concrete, plaster, roofing, flooring, caulking, sealants, tiles, insulation, and outdoor paving such as sidewalks, paving tiles and asphalt.

26. Certified Industrial Hygienist (CIH): Individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that board.

27. Certified Safety Professional (CSP): Individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that board.

28. Chain of Custody: “Chain of Custody” shall mean the form or set of forms that document the collection and transfer of a sample.

29. City: City of New York

30. Clean Room: An uncontaminated area or room that is part of worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

31. Clearance Air Monitoring: Employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers and shall be performed as the final abatement activity.

32. Commissioner: shall mean the head of the Agency that has entered into this contract or his/her duly authorized representative.

33. Competent Person: Shall mean the designated person as defined by OSHA in 29 CFR1926.1101.

34. Curtained Doorway: Device that consists of at least three overlapping sheets of fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

35. Decontamination Enclosure System: Series of connected rooms, separated from the Work Area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

36. Demolition: The dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a demolition permit from the New York City Department of Buildings is required.

37. Department: shall mean the New York City Department of Design and Construction (DDC).

38. NYCDEP or DEP: The New York City Department of Environmental Protection.

39. Disturb: Any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

40. DOB: The New York City Department of Buildings.

41. Egress: A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

42. ELAP: Environmental Laboratory Approval Program administered by the New York State Department of Health.

43. Encapsulant (sealant) or Encapsulating Agent: Liquid material which can be applied to ACM and which temporarily controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

44. Encapsulation: The coating or spraying of asbestos-containing material encapsulant. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

45. Enclosure: Construction of airtight walls and/or ceilings between ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the NYCDEP which prevents the release of asbestos fibers.

46. EPA or USEPA: United States Environmental Protection Agency.

47. Equipment Room: Contaminated area or room that is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

48. Exit: That portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction to provide a protected path of egress travel between the exit access and the exit discharge.

49. FDNY: The Fire Department of the City of New York.

50. Fiber: An acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

51. Fixed Object: A unit of equipment, furniture, or other item in the work area which cannot be removed from the work area. Fixed objects shall include equipment, furniture, or other items that are attached, in whole or in part, to a floor, ceiling, wall, or other building structure or system or to another fixed object and cannot be reasonably removed from the work area. Fixed objects shall also include pipes and other equipment inside the work area which are not the subject of the asbestos project. Active fire suppression system components shall not be considered fixed objects.

52. Glovebag technique: shall mean a method for removing asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool

pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.

53. HEPA-Filter: High efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

54. HEPA vacuum equipment: “HEPA vacuum equipment” shall mean vacuuming equipment with a HEPA filter.

55. Holding Area: Chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

56. Homogeneous Work Area: Portion of the Work Area that contains one type of ACM and/or where one type of abatement is used.

57. Industrial Hygiene: Science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among worker or among the citizens of the community.

58. Industrial Hygienist: Individual having a college or university degree or degrees in Engineering, Chemistry, Physics or Medicine, or related Biological Sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

    a. To recognize the environmental factors and to understand their effect on people and their well being; and

    b. To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and

    c. To prescribe methods to eliminate, control, or reduce such stresses when necessary to alleviate their efforts.

59. Isolation Barrier: The construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.

60. Large Asbestos Project: Asbestos project involving the disturbances (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of ACM or 160 square feet or more of ACM.

61. Log: An official record of all activities that occurred during the project. At a minimum, the log shall identify the building owner, agent, asbestos abatement contractor, and workers, and other pertinent information including daily activities, cleanings and waste transfers, names and certificate numbers of asbestos handler supervisors and asbestos handlers; results of inspections of decontamination systems, barriers, and negative pressure ventilation equipment; summary of corrective actions and repairs; work stoppages with reason for stoppage; manometer readings at least twice per work shift; daily checks of emergency and fire exits and any unusual events.

62. Minor Project: A project involving the disturbance (e.g., removal, enclosure, encapsulation, repair) of 25 linear feet or less of asbestos containing material or 10 square feet or less of asbestos containing material.

63. Movable Object: Unit of equipment or furniture in the Work Area that can be removed from the Work Area.

64. Negative Air Pressure Equipment: Portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the Work Area.

65. NESHAPS: National Emission Standards for Hazardous Air Pollutants.

66. NFPA: The National Fire Protection Association.

67. NIOSH: National Institute for Occupational Safety and Health.

68. DEP or NYCDEP: New York City Department of Environmental Protection

69. NYSDOL: New York State Department of Labor.

70. NYSDOL ICR 56: “NYSDOL ICR 56” shall mean Part 56 of the Official Compilation of Codes, Rules and Regulations of the State of New York or 12 NYCRR Part 56.

71. NYSDOH: The New York State Department of Health.

72. Obstruction: The blocking of a means of egress with any temporary structure or barrier. A double layer of fire-retardant 6-mil polyethylene sheeting shall not be considered an obstruction when it is prominently marked as an exit with photo luminescent signage or paint and cutting tools

(knife, razor) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress. A corridor shall not be considered obstructed when there is a clear path measuring at least three (3) feet wide.

73. Occupied Area: Area of the work site where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

74. OSHA: Occupational Safety and Health Administration.

75. Outside air: “Outside air” shall mean the air outside the work place.

76. Person: Individual, partnership, company, corporation, association, firm, organization, governmental agency, administration, or department, or any other group of individuals, or any officer or employee thereof.

77. Personal Air Monitoring: Method used to determine employees' exposure to airborne asbestos fibers. The sample is collected outside the respirator in the worker's breathing zone.

78. Personal Protective Equipment (PPE): Appropriate protective clothing, gloves, eye protection, footwear, and head gear.

79. Phase Contrast Microscopy (PCM): The measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400).

80. Physician: Person licensed or otherwise authorized under Article 131 Section 65.22 of the New York State Education Law.

81. Plasticize: To cover floors and walls with fire retardant plastic sheeting as herein specified or by using spray plastics as acceptable to the Department.

82. Polarized Light Microscopy (PLM): The measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)

83. Project Designer: A person who holds a valid Project Designer Certificate issued by the New York State Department of Labor.

84. Project Monitor: A person who holds a valid Project Monitor Certificate issued by the New York State Department of Labor.

85. Qualitative Fit Test: Individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face-piece. Acceptable methods include irritant smoke test, odorous vapor test, and taste test.

86. Quantitative Fit Test: Exposing the respiratory wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face-piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the test.

87. Registered Design Professional: A person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York.

88. Removal: Stripping of any asbestos- containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.

89. Renovation: An addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.

90. Repair: Corrective action using specified work practices (e.g., glovebag, plastic tent procedures, etc.) to minimize the likelihood of fiber release from minimally damaged areas of ACM.

91. Replacement material: Any material used to replace ACM that contains less than .01 percent asbestos.

92. Shift: A worker’s, or simultaneous group of workers’, complete daily term of work.

93. Shower Room: Room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

94. Small Asbestos Project: Asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of ACM or more than ten and less than 160 square feet of ACM.

95. Staging Area: Work Area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the Work Area.

96. Strip: To remove asbestos materials from any part of the facility.

97. Structural Member: Load-supporting member of a facility, such as beams and load-supporting walls, or any non-load-supporting member, such as ceiling and non-load-supporting walls.

98. Surface barriers: The plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

99. Surfactant: Chemical wetting agent added to water to improve penetration.

100. Transmission Electron Microscopy (TEM): The measurement protocol for the assessment of the asbestos fiber content of air. Interim Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A.

101. Visible Emissions: Emissions containing particulate material that are visually detectable without the aid of instruments.

102. Washroom: Room between the Work Area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA-vacuumed prior to disposal.

103. Waste decontamination enclosure system: “Waste decontamination enclosure system” shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.

104. Wet Cleaning: “Wet cleaning” shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

105. Wet methods: “Wet methods” shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.

106. Work Area: Designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take(s) place.

107. Worker Decontamination Enclosure System: Portion of a decontamination enclosure system designed for controlled passage of workers and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the Work Area by airlocks and curtained doorways.

108. Work Place: The work area and the decontamination enclosure system(s).

109. Work Place Safety Plan: Construction documents prepared by a registered design professional and submitted for review by DEP in order to obtain an asbestos abatement permit. Such plan shall include, but not be limited to, plans, sections, and details of the work area clearly showing the extent, sequence, and means and methods by which the work is to be performed.

110. Work Site: Premises where abatement activity is being performed. May be composed of one or more Work Areas.

1.06 STANDARD OPERATING PROCEDURES

A. Develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure of the workers, visitors, employees, public, and environment.

B. TELEPHONE DEVICE

The asbestos abatement contractor or his authorized representative shall, at all times during the normal workday or during periods of overtime work under this Contract, carry a mobile cellular telephone capable of transmitting photographs and data. He/she shall supply the Department of Design and Construction with the phone number for the device and he/she is liable to respond back to the calls from DDC within the next one (1) hour period after he/she receives calls from DDC. The cost to the asbestos abatement contractor for this device and all charges accruing thereto is deemed included in the work.

C. The standard operating procedure shall ensure:

1. Tight security from unauthorized entry into the workspace.

2. Restriction of asbestos abatement contractor's personnel to the immediate Work Area and access/egress routes.

3. Donning of proper protective clothing and respiratory protection prior to entering the Work Area.

4. Safe work practices in the work place, including provisions for inter-room communications, exclusion of eating, drinking, smoking, or in any way breaking the respiratory protection.

5. Proper exit practices from the work space to the outside through the showering and decontamination facilities.

6. Removing asbestos in a way that minimizes release of fibers.

7. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes exposure and contamination.

8. Emergency evacuation procedures, for medical or safety situations, to minimize the potential exposure to airborne asbestos fibers for emergency personnel, building occupants, and building environment.

9. Safety from accidents in the workspace, especially from electrical shocks, fall hazards associated with scaffolding, slippery surfaces, and entanglements in loose hoses and equipment.

10. Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work.

11. Engineering controls that minimize exposure to fibers within the workspace.

12. The asbestos abatement contractor shall provide a 24-hour fire watch throughout the entire term of the project, to protect against fire and unauthorized entry into the workspace when required by the NYCDEP. Fire watch shall be performed by an individual who is a certified asbestos worker capable of entering the Work Area for regular inspections.

D. Provide an Asbestos Handler Supervisor to provide continuous supervision of all work, and to be responsible for the following:

1. Ensure that individuals are using proper personal protective equipment, are trained in its use and hold valid NYCDEP and NYSDOL Asbestos Handler certificates.

2. Maintain entry log records and ensure that they are recorded in accordance with the provisions of Title 15, Chapter 1 of RCNY and NYSDOL ICR 56.

3. Surveillance of the Work Areas at a minimum of once per work shift or as required by Title 15, Chapter 1 of RCNY and NYSDOL ICR 56 -7.3, to ensure the integrity of work place isolation, negative pressure equipment and workers personal protective equipment is not torn or ripped and that respiratory protection is worn at all times.

4. Ensure that sufficient personal protective equipment is stored in the clean room.

5. Take precautions to prevent heat stress. Precautions include, but are not limited to, selecting lightweight protective clothing, reducing the work rate, and providing adequate fluid breaks.

6. Perform work area inspection with project monitor prior to the commencement of final clearance air monitoring.

7. The asbestos abatement contractor shall retain the asbestos handler supervisor to perform a visual inspection prior to the post-abatement clearance air monitoring to confirm that all containerized waste has been removed from work and holding areas and there is no visible ACM debris or residue on or about all abated surfaces.

E. ENGINEERING CONTROLS

1. All asbestos projects shall utilize negative pressure ventilation equipment.

   a. The asbestos abatement contractor shall use a manometer to document the pressure differential. The asbestos abatement contractor shall install and make the manometer operational once the negative pressure has been established in the work area. Magnahelic manometers shall be calibrated at least every six months and a copy of the current calibration certification shall be available at the work site.

2. Negative pressure ventilation equipment shall be installed and operated to provide at least one air change in the work area every 15 minutes. Where there are no floor or wall barriers because floor or wall material is being abated, there shall be at least one air change in the work area every ten minutes.

3. The negative pressure ventilation equipment shall operate continuously, 24 hours a day, from the establishment of isolation barriers through successful clearance air monitoring. If such equipment shuts off, adjacent areas shall be monitored for asbestos fibers.

4. A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work place during abatement to ensure that contaminated air in the Work Area does not filter back to uncontaminated areas.

5. If the contaminated area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors, the cut off switch shall be able to turn off the equipment on all floors.

6. On loss of negative pressure or electric power to the negative pressure ventilating units, abatement shall stop immediately and shall not resume until power is restored and negative pressure ventilation equipment is operating again.

7. Negative pressure ventilation equipment shall be exhausted to the outside of the building away from occupied areas.

    a. All openings (including but not limited to operable windows, doors, vents, air intakes or exhausts of any mechanical devices) less than 15 feet from the exterior exhaust duct termination location shall be plasticized with two layers of fire retardant 6-mil polyethylene sheeting, or a second negative pressure ventilation unit with the primary unit's capacity shall be connected in series prior to exhausting to the outside.

    b. Negative pressure ventilation equipment shall exhaust away from areas accessible to the public.

    c. All ducting shall be sealed and braced or supported to maintain airtight joints. Ducts shall be reinforced and shall be installed so as to prevent breakage. Damage to ducts must be repaired immediately.

8. Where ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit's capacity shall be connected in series. The area receiving the exhaust shall have sufficient, non-recycling exhaust capacity to the outside of the structure.

9. In the event that there is a failure of the containment system or a breach in the Isolation Barriers, all abatement work will cease and the asbestos abatement contractor will immediately correct the condition. Abatement work will not resume until the Work Area has been smoke tested by the third party laboratory and approved by the Construction Project Manager.

F. LOCKDOWN ENCAPSULATION PROCEDURES

1. The following procedures shall be followed to seal in non-visible residue while conducting lockdown encapsulation on all surfaces from which ACM has not been removed:

   a. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA Contract shall be used for lockdown encapsulation.

   b. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon unless reviewed and approved by DEP.

   c. Latex paint with solids content greater than 15 percent shall be considered a lockdown sealant for coating all non-metallic surfaces.

   d. Encapsulants shall be applied using airless spray equipment. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

   e. The cleaned layer of the surface barriers shall be removed from walls and floors.

   The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

1.07 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

A. The asbestos abatement contractor shall submit an Asbestos Project Notification (ACP-7) to the NYCDEP listing each work area within the building separately one week in advance of the start of work.

B. The registered design professional shall obtain an asbestos abatement permit authorizing the performance of construction work as required for asbestos projects involving one or more of the following activities:

   1. Obstruction of an exit door leading to an exit stair or the exterior of the building;

   2. Obstruction of an exterior fire escape or access to that fire escape;

3. Obstruction of a fire-rated corridor leading to an exit door;

4. Removal of handrails in an exit stair or ramp;

5. Removal or dismantling of any fire alarm system component including any fire alarm-initiating device (e.g., smoke detectors, manual pull station);

6. Removal or dismantling of any exit sign or any component of the exit lighting system, including photo luminescent exit path markings;

7. Removal or dismantling of any part of a sprinkler system including piping or sprinkler heads;

8. Removal or dismantling of any part of a standpipe system including fire pumps or valves;

9. Removal of any non-load bearing / non-fire-rated wall (greater than 45 square feet or 50 percent of a given wall);

10. Any plumbing work other than the repair or replacement of plumbing fixtures;

11. Removal of any fire-resistance rated portions of a wall, ceiling, floor, door, corridor, partition, or structural element enclosure including spray-on fire resistance rated materials;

12. Removal of any fire damper, smoke damper, fire stopping material, fire blocking, or draft stopping within fire-resistance rated assemblies or within concealed spaces;

13. Any work that otherwise requires a permit from the DOB (full demolitions, alterations, renovations, modifications or plumbing work).

C. The asbestos abatement contractor shall provide a floor plan showing the areas of the building under abatement and the location of all fire exits in said areas. It shall be prominently posted in the building lobby or comparable location, along with a notice stating the location within the building of the negative air cutoff switch, if applicable.

D. When one or more of the activities listed in 1.07 (B) (1-8) and (B)(13) of this specification an asbestos abatement permit is required by DEP. The general contractor is responsible for submitting, a work place safety plan (WPSP) and any other applicable construction documents. These documents must be prepared and sealed by a registered design professional.

E. A WPSP is not required for projects requiring an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (9-12) of this specification. The asbestos abatement contractor shall submit, together with the asbestos project notification, all applicable asbestos abatement permit construction documents.

F. The general contractor shall retain a Registered Design Professional to perform the inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required by Chapter 17 of the Building Code, as follows:

1. A final inspection shall be performed by a registered design professional retained by the general contractor after all work authorized by the asbestos abatement permit is completed. The person performing the inspection shall note all failures to comply with the provisions of the Building Code or approved asbestos abatement permit and shall promptly notify the owner in writing. All defects noted in such inspection shall be corrected. The final inspection report shall either:

   a. Confirm:

      (1) That the construction work is complete, including the reinstallation or reactivation of any building fire safety or life safety component.

      (2) That any defects previously noted have been corrected.

      (3) That all required inspections were performed.

      (4) That the work is in substantial compliance with the approved asbestos abatement permit construction documents, the Building Code, and other applicable laws and rules.

   b. Confirm:

      (1) That the construction work does not return the building (or portion thereof) affected by the abatement project to a condition compliant with the building code and other applicable laws and rules, but that the registered design professional has reviewed an application for asbestos abatement permit construction documents approval that has been approved by the department of buildings, and the subsequent scope of work as approved will, upon completion, render all areas affected by the asbestos project in full compliance with the building code and all applicable laws and rules.

(2) That any defects previously noted that are not addressed by the subsequent scope of work as approved by the department of buildings, have been corrected.

(3) That all required inspections that are not addressed by the subsequent scope of work as approved by the department of buildings were performed.

(4) That all completed work pursuant to an asbestos abatement permit is in substantial compliance with the approved asbestos abatement permit construction documents.

G. The Registered Design Professional shall provide the final inspection reports to be filed with DEP on A-TR1 form. Records of final inspections made by registered design professionals shall be submitted to DDC as part of the close out document package.

H. Erect bilingual (English-Spanish) warning signs around the work space and at every point of potential entry from the outside and at main entrance to building which can be viewed by the public without obstruction, in accordance with OSHA 29 CFR 1926.1101 (K) (Sign Specifications) and Title 15, Chapter 1 of RCNY. The warning signs shall be a bright color so that they will be easily noticeable. The size of the sign and the size of the lettering shall be no less than OSHA requirements.

I. Provide the required labels for all polyethylene bags and all drums utilized to transport contaminated material to the landfill in accordance with OSHA 29 CFR 1926.1101 (K)(2) and by 49 CFR Parts 171 and 172 of the Department of Transportation regulations.

J. Provide any other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable regulations from OSHA, EPA, NIOSH, State of New York and New York City and any additional items mandated for posting by the aforementioned regulations.

K. Furnish all permits, variances and notices required to perform the Work.

1.08 EMERGENCY PRECAUTIONS

A. Establish emergency and fire exits from the Work Area. The clean side of all emergency exits shall be equipped with two full sets of protective clothing and respirators at all times.

B. Notify local medical emergency personnel, both ambulance crews and hospital emergency room staff prior to commencement of abatement operations as to the possibility of having to handle contaminated or injured workmen.

C. Prepare to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated immediately for decontamination. When an injury occurs, precautions shall be taken to reduce airborne fiber concentrations (i.e., misting of the air with water) until the injured person has been removed from the Work Area.

D. Notify, before actual removal of the asbestos material, the local police and fire departments to the danger of entering the Work Area. Asbestos abatement contractor shall make every effort to help these agencies form plans of action should their personnel need to enter the contaminated area.

1.09 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the Department. 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, bound and indexed. The detailed plan of action must be submitted at least five (5) days prior to the pre-construction meeting.

   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.

(4) A schedule of equipment to be used including numbers and types of all major equipment such as HEPA Air Filtration Units, HEPA-vacuums, airless sprayers, Water Atomizing Devices and Type "C" compressors.

e. A written plan and shop drawings for preparation of work site and decontamination chamber.

f. Description of protective clothing and approved respirator to be used, make, model, NIOSH approval numbers.

g. Delineation of responsibility of work site supervision, including competent person, with names, resumes, and home telephone numbers.

h. Explanation of decontamination sequence and isolation techniques.

i. Description of specific equipment to be utilized, including make and model number of air filtration devices, vacuums, sprayers, etc.

j. Description of any prepared methods, procedures, techniques, or equipment other than those specified in the Contract Documents.

k. Explanation of the handling of asbestos contaminated wastes including EPA and NYCDEC identification numbers of Waste Hauler.

l. Description of the final clean-up procedures to be used.

m. Name and qualifications of asbestos abatement contractor's Air Monitor including AIHA accreditation, and proof of NIOSH PAT and NIST/NVLAP Bulk Quality Assurance Proficiency of OSHA samples for approval by the City of New York Department of Design and Construction.

n. 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) 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.

o. 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.

p. Worker Training and Medical Surveillance: Asbestos abatement contractor shall submit a list of the NYSDOL and NYCDEP Asbestos supervisors and handlers who will work on this project. Present evidence that workers have received proper training required by the regulations and required by OSHA 29 CFR 1926.1101 (Asbestos Standard) and 1926.1200 (HAZCOM standard) and any other standards applicable to the work.

q. 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 all information specified in ICR56-3.4 (a)(2)(i).

(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 a copy of the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

(3) 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:
Submit copies of the following items to the Construction Project Manager during the work:

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 at weekly progress meetings.

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 consist of:

   a. Copies of licenses of all asbestos abatement contractors involved in the project;

   b. Copies of DEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

   c. Copies of all project notifications and reports filed with DEP, NYSDOL and EPA 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. All data related to bulk sampling including the results of any asbestos surveys performed by an asbestos investigator;

   h. Copies of all asbestos waste manifests;

   i. A copy of all Project Monitor's Reports (ACP-15).

   j. A copy of each ATR-1 Form completed for the asbestos project (if required).

   k. A copy of each Asbestos Project Conditional Closeout Report (ACP-20).

   l. A copy of the Asbestos Project Completion Form (ACP-21).

   m. A copy of the project record shall be submitted to DDC and its Third Party Air Monitor within 48 hours of the Issuance of the ACP-21 form, as part of the close out documents.

9. The asbestos abatement contractor shall submit one of the following certifications to the general contractor, with a copy provided to DDC:

   a. Asbestos Project Completion Form. If an asbestos project has been performed, a copy of the asbestos project completion form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

   b. An Asbestos Project Conditional Close-out Form. If an asbestos project has been performed a copy of the asbestos project conditional close-out form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

1.10 QUALITY ASSURANCE

A. All work required for the completion of this project or called for in this Specification must be executed in a workmanlike manner by using the appropriate methods established by regulatory requirements and/or industrial standards. All workmanship or work methods are subject to review and acceptance by the Construction Project Manager. Throughout the Specification, reference is made to codes and standards which establish qualities, levels or types of workmanship which will be considered acceptable. It is the asbestos abatement contractor's responsibility to comply with these codes and standards during the execution of this work.

B. All materials and equipment required or consumed during the work of this Contract must meet the minimum acceptable criteria established by codes and standards referenced elsewhere in this Specification. Materials and equipment must be submitted for prior approval to the DDC project manager as part of the asbestos abatement contractor's "Shop Drawings".

C. It is the asbestos abatement contractor's responsibility, when so required by the Specification or upon written request from the Commissioner or his representative to furnish all required proof that workmanship, materials and/or equipment meet or exceed the codes and standards referenced. Such proof shall be in the form requested, typically a certified report or test conducted by a testing entity approved for that purpose by DDC.

D. The asbestos abatement contractor shall furnish proof that employees working under his supervision have had instruction on the dangers of asbestos exposure, on respirator use, decontamination, and OSHA regulations. This proof shall be in the form of a notarized affidavit to the effect that the above requirements have been satisfied and a copy of the Job Hazard Analysis (JHA) with tool box meeting executed meeting sign in sheet.

E. The asbestos abatement contractor will have posted and in view at the job site the OSHA regulations 29 CFR 1910.1001, and 1926.1101 Asbestos Standard, and 29 CFR 1926.59 Hazard Communication Standard Environmental Protection Agency 40 CFR, Part 61, subpart B: National Emission Standard for asbestos, asbestos stripping, work practices and disposal of asbestos waste. One copy of NYC Title 15, Chapter 1 of RCNY and NYS DOL ICR 56 at the job site at all times.

F. Familiarity with Pertinent Codes and Standards: In procuring all items used in this work, it is the asbestos abatement contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements, and are suitable for their intended use.

G. Rejection of Non-Complying Items: The Commissioner reserves the right to reject items incorporated into the work that fail to meet the specified minimum requirements. The Commissioner further reserves the right, and without prejudice to other recourse that maybe taken, to accept non-complying items subject to an adjustment in the Contract amount as approved by the City.

H. Applicable Regulations, Codes and Standards: Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. American National Standards Institute (ANSI)
(Successor to USASI and ASA)
25 West 43rd Street (between 5th and 6th Avenue) 4th Floor
New York, NY 10036
212-642-4900

2. American Society for Testing and Materials (ASTM)
100 Bar Harbor Drive
West Conshohocken, PA 19428-2959
610-832-9500

3. National Institute for Occupational Safety and Health (NIOSH)
Robert A. Taft Laboratory
4676 Columbia Pkwy
Mailstop R12 Cincinnati, Ohio 45226
513-841-4428

4. National Electrical Code (NEC)
   See NFPA

5. National Fire Protection Association (NFPA)
   1 Batterymarch Park
   Quincy, Massachusetts 02169-7471
   617-770-3000

6. New York City Fire Department (FDNY)
   9 Metrotech Center
   Brooklyn, NY 11201-5431
   718-999-2117

7. New York City Department of Buildings (NYC DOB)
   Enforcement Division
   280 Broadway, New York, New York 10007
   212- 566-2850

8. New York City Department of Environmental Protection (NYCDEP)
   Bureau of Environmental Compliance
   Asbestos Control Program
   59-17 Junction Boulevard, 8th Floor
   Corona, New York 11368
   718-595-3682

9. New York City Department of Health and Mental Hygiene (NYC DOHMH)
   Environmental Investigation
   125 Worth Street
   New York, New York 10013
   212-442-3372

10. New York State Department of Labor (NYSDOL)
    Division of Safety and Health, Engineering Services Unit
    State Office Building Campus
    Albany, New York 12240-0010

11. New York City Department of Sanitation
    125 Worth Street, Room 714
    New York, New York 10013
    212-566-1066

12. Occupational Safety and Health Administration (OSHA)
    Region II - Regional Office
    201Varick Street, Room 908
    New York, New York 10014
    212-337-2378

13. United States Environmental Protection Agency (EPA or USEPA)
Region II
Asbestos NESHAPS Contact
Air and Waste Management Division
(Air Compliance Branch) – USEPA
290 Broadway, 21st Floor
New York, New York 10007-1866
212-637-3660

I. Post all applicable regulations in a conspicuous place at the job site. Assure that the regulations are not altered, defaced or covered by other materials. One copy of each regulation must also be kept at the Asbestos abatement contractor's office.

1.11 CITY/ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

A. The normal occupants of the Work Areas will be relocated by the City prior to the performance of the abatement work and returned there to at the conclusion of the abatement work, at no cost to the asbestos abatement contractor. However, the asbestos abatement contractor shall protect all furniture and equipment in the Work Areas in a manner as hereinafter specified. In addition, the asbestos abatement contractor shall perform the work of this Contract in a manner that will be least disruptive to the normal use of the non-Work Areas in the building.

B. Asbestos abatement contractor shall be responsible for cleaning all portable items not specifically addressed by the Facility, in the Work Areas, or dispose of same as asbestos contaminated waste.

C. Facility to provide asbestos abatement contractor with a list of items that cannot be removed and need special attention.

D. Facility to stop all deliveries that may be scheduled to the Work Area while work is in progress.

E. Facilities to have authorized personnel on site at all times or supply the asbestos abatement contractor with means of contacting such personnel without unreasonable delay. Such personnel shall have access to all areas, have knowledge of electrical, and air handling equipment. Such personnel shall assist the asbestos abatement contractor in case of any power failure or breakdown to shut down air supply systems, to reset and control all protective systems such as alarms, sprinklers, locks, etc. The Facility shall ensure no active air handling systems are operating within the Work Area.

F. City will not occupy the portions of the building, in which work is being performed during the entire asbestos removal operation, including completion of clean up.

G. Asbestos abatement contractor shall provide a plan for 24 hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into Work Areas, as required by the Department.

H. Asbestos abatement contractor shall provide surveillance by a fire watch and set forth procedures to be taken for the safety of building occupants in the event of an emergency, in accordance with the WPSP and DEP regulations.

I. Should the failure of any utility occur, the City will not be responsible to the asbestos abatement contractor for loss of time or any other expense incurred.

J. Facility will be responsible to notify the asbestos abatement contractor of any planned electrical power shutdowns in order to ensure that there are no power interruptions in the negative air pressure systems.

K. Asbestos abatement contractor shall remove all flammable materials from the work area and all sources of ignition (including but not limited to pilot lights) shall be extinguished.

L. Asbestos abatement contractor shall require a competent person (as defined in OSHA 1926.1101) to perform the following functions and to be on-site continuously for the duration of the project:

1. Monitor the set up of the Work Area enclosure and ensure its integrity.

2. Control entry and exit into the work enclosure.

3. Ensure that employees are adequately trained in the use of engineering controls, proper work practices, proper personal protective equipment and in decontamination procedures.

4. Ensure that employees use proper engineering controls, proper work practices, proper personal protective equipment and proper decontamination procedures.

5. The competent person (as defined in OSHA1926.1101) shall check for rips and tears in work suits, and ensure that they are mended immediately or replaced.

1.12 USE OF BUILDING FACILITIES

A. City shall make available to the asbestos abatement contractor, from existing outlets and supplies, all reasonably required amounts of water and electric power at no charge.

B. Electric power to all Work Areas shall be shut down and locked out except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided by asbestos abatement contractor in accordance with applicable codes. All power to Work Areas shall be brought in from outside the area through ground-fault interrupter circuits installed at the source. Stationary electrical equipment within the Work Area, which must remain in service, shall be adequately protected, enclosed and ventilated. The Facility will identify all electric lines that must remain in service. Asbestos abatement contractor shall protect all lines.

C. Asbestos abatement contractor shall provide, at his own expense, all electrical, water, and waste connections, tie-ins, extensions, and construction materials, supplies, etc. All water tie-ins shall be hard piped with polyethylene or copper piping. At the end of each shift, asbestos abatement contractor shall disconnect all hoses within the work zone and place in equipment room of the worker decontamination unit. Asbestos abatement contractor shall ensure positive shutoff of all water to Work Area during non-working hours.

D. Utilities:

1. General:
   All temporary facilities required to be installed, shall be subject to the approval of the Commissioner. Prior to starting the work at any site; specify clearly the temporary locations of facilities preferably with sketches and submit the same to the Construction Project Manager for approval.

2. 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. All temporary plumbing or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work. Shower water for the decontamination unit shall be provided hot. Heating of water, if necessary, shall be provided by the asbestos abatement contractor.

3. Electricity:
   The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. All temporary electrical work or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work.

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.

A dedicated power supply for the negative pressure ventilating units shall be utilized. The negative air equipment shall be on a ground fault circuit interrupter (GFCI) protected circuit separate from the remainder of the work area temporary power circuits.

E. Asbestos abatement contractor shall shut down and lock out all electric power to all work areas except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided in accordance with all applicable codes. Existing light sources (e.g., house lights) shall not be utilized. All power to work areas shall be brought in from outside the area through ground-fault circuit interrupter at the source.

1. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

   a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

   b. Any energized circuits remaining in the work area shall be posted with a minimum two (2) inch high lettering warning sign which reads: DANGER LIVE ELECTRICAL - KEEP CLEAR. A sign shall be placed on all live covered barriers at a maximum of ten (10) foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work area of the existence of the energized circuits.

2. Any source of emergency lighting which is temporarily blocked as a result of work place preparation shall be replaced for the duration of the project by battery operated or temporary exit signs, exit lights, or photo luminescent path markings.

F. Asbestos abatement contractor shall provide a separate temporary electric panel board to power asbestos abatement contractor's equipment. The Facility will designate an existing electrical source in proximity to the Work Area. Asbestos abatement contractor's licensed electrician shall provide temporary tie-in via cable, outlet boxes, junction boxes, receptacles and lights, all with ground fault interruption. At no time shall extension cords greater than 50-feet in length be allowed. All temporary electrical installation shall be in accordance with OSHA regulations. The electric shut down for power panel tie-in will be on off-hours and must be coordinated with the Facility. Asbestos abatement contractor shall provide to the City a specification and drawing outlining his power requirements at the pre-construction meeting.

G. Additional electrical equipment (i.e., transformers, etc.), which is necessary due to the lack of existing power on the floor, shall be at the asbestos abatement contractor's expense.

H. Asbestos abatement contractor shall provide fire protection in accordance with all State and Local fire codes.

I. Sprinklers, standpipes, and other fire suppression systems shall remain in service and shall not be plasticized.

J. When temporary service lines are no longer required, they shall be removed by the asbestos abatement contractor. Any parts of the permanent service lines, grounds and buildings, disturbed or damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by asbestos abatement contractor. Senior Stationary Engineer will inspect and test all switches, controls, gauges, etc. and shall submit a list to the Construction Project Manager of any equipment damaged by the asbestos abatement contractor.

K. Asbestos abatement contractor shall supply hot shower water necessary for use in the decontamination unit.

1.13 USE OF THE PREMISES

A. Asbestos abatement contractor shall confine his apparatus, the storage of materials, and supplies, and the operation of his workmen to limits established by law, ordinances, and the directions of the Construction Project Manager and the Facility. All flammable or combustible materials shall be properly stored to obviate fire and in areas approved by the Facility.

B. Asbestos abatement contractor shall assure that no exits from the building are obstructed, that appropriate safety barriers are established to prevent access, and that Work Areas are kept neat, clean, and safe.

C. Asbestos abatement contractor shall maintain exits from the work area or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

D. If the openings of temporary structural partitions related to abatement work areas block egress, the partition shall consist of two sheets of fire retardant 6-mil plastic, prominently marked as an exit with photo luminescent paint or signage. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress.

E. All surrounding work, fixtures, soil lines, drains, water lines, gas pipes, electrical conduit, wires, utilities, duct work railings, shrubbery, landscaping, etc. which are to remain in place shall be carefully protected and, if disturbed or damaged, shall be repaired or replaced as directed by the City, at no additional cost.

F. All routes through the building to be used by the asbestos abatement contractor shall first be approved by the Construction Project Manager and the Facility.

G. Attention is specifically drawn to the fact that other asbestos abatement contractors, performing the work of other Contracts, may be (or are) 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 asbestos abatement contractors who may be on (or are on) any site of the work of this Contract. Regulated area exempted.

H. Temporary toilet facilities must be provided by the asbestos abatement contractor on the site. Coordinate location of facilities with Construction Project Manager. No toilet facilities will be allowed in the Work Area.

1.14 PROTECTION AND DAMAGE

A. The asbestos abatement contractor is responsible to cover all furniture and equipment that cannot be removed from Work Areas. Moveable furniture and equipment will be removed from Work Areas by asbestos abatement contractor prior to start of work and returned upon successful completion of the final air testing. At the conclusion of the work (after clearance level of air testing reaches the acceptable limit), the asbestos abatement contractor will remove all plastic covering from the walls, floors, furniture, equipment and reinstall furniture and equipment in the cleaned Work Area. The asbestos abatement contractor shall remove all shades, curtains and drapes from the Work Area, and reinstall the same following the final clean up.

B. Prior to plasticizing, the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods. Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

C. Use rubber tired vehicles that use non-volatile fuels for conveying material inside building and provide temporary covering, as necessary, to protect floors.

D. No materials or debris shall be thrown from windows or doors of the building. Building waste management system shall NOT be used to remove any asbestos waste from the building.

E. Debris shall be removed from the work site daily. Premises shall be left neat and clean after each work shift, so that work may proceed the next regular workday without interruption. Limited bag storage may take place within the Work Area when approved by the Construction Project Manager.

F. Protect floors and walls along removal routes from damage, wear and staining with contamination control flooring. All finished surfaces to be protected with Masonite or other rigid sheathing material.

G. A preliminary inspection for pre-existing damage shall be conducted by asbestos abatement contractor and representative of the City before commencement of the project.

1.15 RESPIRATORY PROTECTION REQUIREMENTS

A. Respiratory protection shall be worn by all individuals who may be exposed to asbestos fibers from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with Regulations and these Specifications.

B. Asbestos abatement contractor shall develop and implement a written respiratory protection program with required site-specific procedures and elements. The program shall be administered by a properly trained individual. The written respiratory protection program shall include the requirements set forth in OSHA Standard 29 CFR 1910.134, at a minimum.

C. The Asbestos abatement contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the Work Area(s), as specified in OSHA Standards 26 CFR 1910.134 and 29 CFR 1926.1101, NIOSH Standard 42 CFR 84, or as more stringently specified otherwise, herein.

D. Where respirators with disposable filter parts are employed, the asbestos abatement contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.

E. All respiratory protection shall be NIOSH approved. All respiratory protection shall be provided by asbestos abatement contractor, and used by workers in conjunction with the written respiratory protection program.

F. Asbestos abatement contractor shall provide respirators selected by an Industrial Hygienist that meet the following requirements:

Table 1. -- Assigned Protection Factors[5]

Type of Respirator[1,2]	Half mask	Full facepiece	Helmet/hood
1. Air-Purifying Respirator	[3]10	50	……
2. Powered Air-Purifying Respirator (PAPR)	50	1,000	[4]25/1,000
3. Supplied-Air Respirator (SAR) or Airline Respirator			
• Demand mode	10	50	……
• Continuous flow mode	50	1,000	[4]25/1,000
• Pressure-demand or other positive-pressure mode	50	1,000	……
4. Self-Contained Breathing Apparatus (SCBA)			
• Demand mode	10	50	50
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	……....	10,000	10,000

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

G. Selection of high efficiency filters:

1. All high efficiency filters shall have a nominal efficiency rating of 100 (99.97-percent effective) when tested against 0.3-micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.

2. Choose N-, R-, or P-series filters based upon the presence or absence of oil particles.

a. N-series filters shall only be used for non-oil solid and water based aerosols or fumes.

b. R- and P-series filters shall be used when oil aerosols or fumes (i.e., lubricants, cutting fluids, glycerin, etc.) are present. The R-series filters are oil resistant and the P-series filters are oil proof.

c. Follow filter manufacture recommendations.

3. If a vapor hazard exists, use an organic vapor cartridge in combination with the high efficiency filter.

H. Historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for an abatement task. Historical data provided by the asbestos abatement contractor shall be based on personal air monitoring performed during work operations closely resembling the processes, type of material, control methods, work practices, and environmental conditions present at the site. Documentation of aforementioned results may be requested by the City and/or Third-Party Air Monitor for review. This will not relieve the asbestos abatement contractor from providing personal air monitoring to determine the time-weighted average (TWA) for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101.

I. At no time during actual removal operations shall half-mask air purifying respirators be allowed unless a full 8-hour TWA and excursion limit have been conducted, and reviewed by the Construction Project Manager. If the TWA and excursion limit have not been conducted, a Supplied-Air Respirator (SAR) or Airline Respirator or Self-Contained Breathing Apparatus (SCBA) must be used. Use of single use dust respirators is prohibited for the above respiratory protection.

J. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

K. Asbestos abatement contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every 12 months thereafter with the type of respirator he/she will be using.

L. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

M. No facial hairs (beards) shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

N. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the asbestos abatement contractor at the asbestos abatement contractor's expense.

O. Respiratory protection maintenance and decontamination procedures shall meet the following requirements:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134 (b); and

2. High efficiency filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures as stated in Section 3.03 and/or 3.04.

4. Airline respirators with high efficiency filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator face pieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the face-piece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

P. Authorized visitors shall be provided with suitable respirators and instruction on the proper use of respirators whenever entering the Work Area. Qualitative fit test shall be done to ensure proper fit of respirator.

1.16 PROTECTIVE CLOTHING

A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. Provide to all workers, foremen, superintendents, authorized visitors and inspectors, protective disposable clothing consisting of full body coveralls, head covers, gloves and 18-inch high boot type covers or reusable footwear.

B. In addition to personal protective equipment for workers, the asbestos abatement contractor shall make available at each worksite at least four (4) additional uniforms and required respiratory equipment each day for personnel who are authorized to inspect the work site. He/she shall also provide, for the duration of the work at any site involving a decontamination unit for worksite access, a lockable storage locker for use by the Construction Project Manager. In addition to respiratory masks for workers, the asbestos abatement contractor must have on hand at the beginning of each work day, at least four (4) masks each with three sets of fresh filters, for use by personnel who are authorized to inspect the worksite and

are medically qualified to don a respirator. The asbestos abatement contractor shall check for proper fit of the respirators of all City personnel authorized to enter the Work Area.

C. Asbestos handlers involved in tent procedures shall wear two (2) disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment. All street clothes shall be removed and stored in a clean room within the work site. The double layer personal protective equipment shall be used for installation of the tent and throughout the procedure, if a decontamination unit (with shower and clean room) is contiguous to the Work Area, only one (1) layer of disposable personal protective equipment shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.

D. The outer disposable suit (if 2 suits are worn) shall be removed and remain in the tent upon exiting. Following the tent disposal and work site clean up the workers shall immediately proceed to a shower at the work site. The inner disposal unit and respirator shall be removed in the shower after appropriate wetting. The disposal clothing shall be disposed of as asbestos-containing waste material. The workers shall then fully and vigorously shower with supplied liquid bath soap, shampoo, and clean dry towels.

E. Coveralls: provide disposable full-body coveralls and disposable head covers. Require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes for all workers in the Work Area.

F. Boots: provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Paint uppers of all boots yellow with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason after being contaminated with ACM and/or dust.

G. Hard Hats: provide hard hats as required by OSHA for all workers, and provide a minimum of four spares for Inspectors, visitors, etc. Label all hats with same warning label as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may cause potential head injury. Provide hard hats of the type with polyethylene strap suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean and decontaminate and bag hard hats prior to removing them from the Work Area at the end of the work.

H. Goggles: provide eye protection (goggles) as required by OSHA for all workers involved in any activity that may potentially cause eye injury. Require them to be worn at all times during these activities. Thoroughly clean and decontaminate goggles before removing them from the Work Area.

I. Gloves: provide work gloves to all workers, of the type dictated by the Work and OSHA Standards. Do not remove gloves from the Work Area. Dispose of as asbestos contaminated waste at the end of the work. Gloves shall be worn at all times, except during Work Area Preparation activities that do not disturb ACM.

J. Reusable footwear, hard hats and eye protection devices shall be left in the contaminated Equipment Room until the end of the Asbestos Abatement Work.

K. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the workspace to the outside through the decontamination facility.

L. Adequate supplies of disposable coveralls, head covers and foot covers shall be maintained by the asbestos abatement contractor for authorized representatives who may inspect the Work Area.

1.17 AIR MONITORING - ASBESTOS ABATEMENT CONTRACTOR

A. Asbestos abatement contractor shall employ a qualified industrial hygiene firm to conduct OSHA personal exposure monitoring air samples in accordance with OSHA Regulations, 1926.1101 (Asbestos Standards for Construction) to establish representative full shift monitoring data, per task, to determine respiratory protection. The asbestos abatement contractor may submit representative Personal exposure monitoring data for a project of similar size and complexity in lieu of performing monitoring in accordance with OSHA 29CFR 1926.1101.

B. The asbestos abatement contractor shall ensure that a qualified industrial hygiene laboratory for OSHA personal exposure monitoring is utilized. Such laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

C. Sampling and analysis methods shall be per NIOSH 7400A.

D. Test Reports:

1. Promptly process and distribute one copy of the test results, to the Commissioner via email.

2. Prompt reports are necessary so that if required, modifications to work methods and/or practices may be implemented as soon as possible.

3. Asbestos abatement contractor shall post the personal exposure monitoring results at the jobsite within 24 hours of receipt of the results.

E. Competent person shall conduct inspections and provide written reports daily. Inspections will include checking the standard operating procedures, engineering control systems, respiratory protection and decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.

F. All costs for required the asbestos abatement contractor's air monitoring shall be borne by the asbestos abatement contractor.

G. The City reserves the right to conduct air and surface dust sampling in conjunction with and separate from the Third-Party Air Monitor for the purposes of Quality Assurance.

1.18 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). This laboratory shall meet the standards stated in Paragraph 1.17. B.

C. Observations will include, but not be limited to, checking the standard operating procedures, engineering control systems, respiratory protection, decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project that may affect the health and safety of the environment, Asbestos abatement contractor, and/or facility occupants.

D. 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.

E. 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.

F. At a minimum, air sampling shall be conducted in accordance with the following schedule:

Abatement Activity	Pre-Abatement	During Abatement	Post- Abatement
Equal to or greater than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	TEM
Less than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	PCM

Note: TEM is acceptable wherever PCM is required.

G. The number of air samples required per stage of abatement and size of abatement project is listed in the table below:

		Pre-Abatement	During Abatement	Post Abatement
	Large Asbestos Projects			
1.	Full Containment	10	5	10
2.	Glovebag inside Tent	5[a]	5[a]	5[a]
3.	Exterior Foam and Vertical Surfaces	-	5[c]	5[d]
4.	Interior Foam	10	5[c]	10[d]
	Small Asbestos Projects			
1.	Full Containment	6	3	6
2.	Glovebag inside Tent	3[b]	3[b]	3[b]
3.	Tent	3[b]	3[b]	3[b]
4.	Exterior Foam and Vertical Surfaces	-	3[c]	3[d]
5.	Interior Foam	6	3[c]	6[d]
	Minor Projects			
1.	Glovebag inside Tent	-	-	1[d]
2.	Tent	-	-	1[d]
3.	Exterior Foam and Vertical Surfaces	-	-	1[d]
4.	Interior Foam	-	-	1[d]

[a] if more than three (3) tents then two (2) samples required per enclosure.

[b] if more than three (3) tents then one (1) sample required per enclosure.

[c] samples shall be taken within the work area(s).

[d] area sampling is required only if:
- visible emissions are detected during the project
- during-abatement area sampling results exceeded 0.01 f/cc or the pre-abatement area sampling result(s) for interior projects where applicable.
- work area to be reoccupied is an interior space at a school, healthcare, or daycare facility.

H. Prior to commencement of abatement activities, the Third Party Air Monitoring Firm will collect a minimum number of area samples inside each homogeneous work area.

1. Samples will be taken during normal occupancy activities and circumstances at the work site.

2. Samplers shall be located within the proposed work area and at all proposed isolation barrier locations.

3. Samples shall be analyzed using PCM.

4. The number of samples to be collected will be determined by the size of the project and the abatement methods to be utilized.

I. Frequency and duration of the air sampling during abatement shall be representative of the actual conditions during the abatement. The size of the asbestos project will be a factor in the number of samples required to monitor the abatement activities. The following minimum schedule of samples shall be required daily.

1. For large asbestos projects employing full containment, area air sampling shall be performed at the following locations:

a. Two area samples outside the work area in uncontaminated areas of the building, remote from the decontamination facilities.

(1) Primary location selection shall be within 10 feet of isolation barriers.

(2) Where negative ventilation exhaust runs through uncontaminated building areas, one of the area samples will be required in these areas to monitor any potential fiber release.

(3) Where exhaust tubes have been grouped together in banks of up to five (5) tubes, with each tube exhausting separately and the bank of tubes terminating together at the same controlled area, one area air sample shall be taken.

b. One area sample within the uncontaminated entrance to each decontamination enclosure system.

c. Where adjacent non-work areas do not exist, an exterior area sample shall be taken.

d. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct.

e. One area sample outside, but within 25 feet of, the building or structure, if the entire building or structure is the work area.

2. For large asbestos projects involving interior foam method, area air sampling shall be performed at the following sampling locations:

    a. One area sample taken outside the work area within 10 feet of isolation barriers.

    b. One area sample taken within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.

    c. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct, if applicable.

    d. Three area samples inside the work area.

    e. One area sample where the negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

3. For large asbestos projects employing the glovebag procedure within a tent, a minimum of five continuous air samples shall be taken concurrently with the abatement for each work area, unless there are more than three enclosures, in which case two area samples per enclosure are required.

    a. Four area samples taken outside the work area within ten feet of tent enclosure(s).

    b. One area sample taken within the uncontaminated entrance to each worker and waste decontamination enclosure system.

    c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

    d. One area sample where negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

4. For large asbestos projects involving exterior foam method or removal of ACM from vertical surfaces, a minimum of five continuous area samples shall be taken concurrently with the abatement for each work area using the following minimum requirements:

    a. Three area samples inside the work area and remote from the decontamination systems.

b. One area sample within the uncontaminated entrance to each worker and waste decontamination enclosure system.

c. One area sample outside the work area within 25 feet of the building or structure, if the entire building or structure is the work area.

d. One area sample inside the building or structure at the egress point to the work area, if applicable.

5. For small asbestos projects employing full containment, a minimum of three continuous area samples shall be taken concurrently with the abatement for each work area at the following locations:

a. Two area samples taken outside the work area within ten feet of the isolation barriers.

b. One area sample within the uncontaminated entrance to each worker or waste decontamination enclosure system.

c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

d. One area sample where negative ventilation exhaust ducting runs through an uncontaminated building area, if applicable.

6. Tent Procedures:
For projects involving more than 25 linear feet or 10 square feet, a minimum of three continuous samples shall be taken concurrently throughout abatement.

J. Post-abatement clearance air monitoring for projects not solely employing glove-bag procedures shall include a minimum number of area samples inside each homogeneous work area and outside each homogeneous work area (five samples inside/five samples outside for Large Projects and three samples inside/three samples outside for Small Projects). In addition to the five sample inside/five sample outside minimum for Large Projects, one additional representative area sample shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

K. Post-abatement clearance air monitoring for Small Projects solely employing glove-bag procedures is not required unless one or more of the following events occurs. In such cases, post-abatement clearance air monitoring procedures shall be followed. The events requiring post-abatement clearance air monitoring are:

1. The integrity of the glove-bag was compromised,

2. Visible emissions are detected outside the glove-bag, and/or

3. Ambient levels exceed 0.01 f/cc during abatement.

L. Monitoring requirements for other than post-abatement clearance air monitoring are as follows:

1. The sampling zone for indoor air samples shall be representative of the building occupants' breathing zone.

2. If possible, outdoor ambient and baseline samplers should be placed about 6 feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.

3. For outdoor samples, if access to electricity and concerns about security dictate a rooftop site, locations near vents and other structures on the roof that would unduly affect airflow shall be avoided.

4. Air sampling equipment shall not be placed in corners of rooms or near obstructions such as furniture.

5. Samples shall have a chain of custody record.

M. Post-abatement clearance air monitoring requirements are as follows:

1. Sampling shall not begin until at least one hour after wet cleaning has been completed and no visible pools of water or condensation remain.

2. Samplers shall be placed at random around the work area. If the work area contains the number of rooms equivalent to the number of required samples based on floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.

3. The representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area, and 25 feet from the isolation barriers.

N. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

1. Before starting the sampling pumps, use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area. This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area; then

2. Place a 20-inch diameter fan in the center of the room. Use one fan per 10,000 cubic feet of room space. Place the fan on slow speed and point it toward the ceiling.

3. Start the sampling pumps and sample for the required time or volume.

4. Turn off the pump and then the fan(s) when sampling is completed.

5. Collect a minimum number of area samples inside and outside each homogeneous work area (five inside/five outside samples for Large Projects and three inside/three outside samples for Small Projects). In addition to the minimum for Large Projects, one representative area samples shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

O. For post-abatement monitoring, area samples shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM	1,800 liters	5 to 15 liters/minute
TEM	1,250 liters	1 to 10 liters/minute

1. Each homogeneous work area that does not meet the clearance criteria shall be thoroughly re-cleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site meets the clearance criteria.

2. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied independently to each work area.

3. Should airborne fiber concentrations exceed the clearance criteria, the asbestos abatement contractor shall re-clean the work area utilizing wet wiping and HEPA-vacuuming techniques. Following completion of re-cleaning activities, the Third-Party Air Monitor will perform an observation of the Work Area. If the Third-Party Air Monitor determines that the work was performed in accordance with the specifications, the appropriate settling period will be observed and additional air sampling will be performed.

4. All costs resulting from additional air tests and observations shall be borne by the asbestos abatement contractor. These costs may include, but are not limited to, labor, analysis fees, materials, and expenses.

5. After the area has been found to be in compliance, the asbestos abatement contractor may remove Isolation Barriers and perform final cleaning as specified.

P. Clearance and/or Re-occupancy Criteria:

1. The clearance criteria shall be applied to each homogeneous work area independently.

2. For PCM analysis, the clearance air monitoring shall be considered satisfactory when each of the 5 inside/5 outside samples for Large Projects and/or 3 inside/3 outside samples for Small Projects is less than or equal to 0.01 f/cc or the background concentrations, whichever is greater.

3. For TEM analysis, the clearance air monitoring shall be considered satisfactory when the requirements stated in 40 CFR Part 763, Subpart E, Appendix A, Section IV are met.

4. As soon as the air monitoring tests are completed and analyzed, the Third-Party Air Monitor will send the results of such tests to the City and notify the Asbestos abatement contractor.

5. The asbestos abatement contractor shall initiate the appropriate closeout process in DEP ARTS within 24 hours of the Re-occupancy letter being issued by the Third-Party Air Monitoring Firm. This will allow the Third-Party Air Monitoring Firm to complete and submit the ACP-15 forms for each specific work area.

6. The asbestos abatement contractor shall provide the ACP-20 and ACP-21 forms to the general contractor within 48 hours of receipt by DEP.

1.19 TAMPERING WITH TEST EQUIPMENT

All parties to this Contract are hereby notified that any tampering with testing equipment will be considered an attempt at falsifying reports and records to federal and state agencies and each offense will be prosecuted under applicable state and federal criminal codes to the fullest extent possible.

1.20 GUARANTEE

A. Work performed in compliance with this Contract shall be guaranteed for a period of one year from the date the completed work is accepted by the City.

B. The asbestos abatement contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism, as determined by the Commissioner.

C. The City will notify the asbestos abatement contractor in writing regarding defects in work under the guarantee.

PART 2 – PRODUCTS

2.01 MATERIAL HANDLING

A. Deliver all materials to the job site in their manufacturer's original container, with the manufacturer's label intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. Store all materials on pallets, away from any damp and/or wet surface. Cover materials in order to prevent damage and/or contamination.

3. Promptly remove damaged materials and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the City.

B. The Construction Project Manager may reject as non-complying such material and products that do not bear identification satisfactory to the Construction Project Manager as to manufacturer, grade, quality and other pertinent information.

2.02 MATERIALS

A. Wetting agents: (Surfactant) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

B. Encapsulants: Liquid material which can be applied to asbestos-containing material which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

C. During abatement activities, replacement materials shall be stored outside the work area in a manner to prevent contamination. Materials required for the asbestos project (i.e., plastic sheeting, replacement filters, duct tape, etc.) shall be stored to prevent damage or contamination.

D. Framing Materials and Doors: As required to construct temporary decontamination facilities and isolation barriers. Lumber shall be high grade, new, finished one side and fire retardant.

E. Fire Retardant Polyethylene Sheeting: minimum uniform thickness of 6-mil. Provide largest size possible to minimize seams. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

F. Fire Retardant Reinforced Polyethylene Sheeting: For covering floor of decontamination units, provide translucent, nylon reinforced or woven polyethylene laminated, fire retardant polyethylene sheeting. Provide largest size possible to minimize seams, minimum uniform thickness 6-mil. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

G. Drums: Asbestos-transporting drums, sealable and clearly marked with warning labels as required by OSHA and EPA.

H. Polyethylene Disposal Bags: Asbestos disposal bags, minimum of fire retardant 6-mil thick. Bags shall be clearly marked with warning labels as required by OSHA and EPA.

I. Signs: Asbestos warning signs for posting at perimeter of Work Area, as required by OSHA and EPA.

J. Waste Container Bag Liners and Flexible Trailer Trays: One piece leak-resistant flexible tray with absorbent pad.

K. Tape: Provide tape which is of high quality with an adhesive that is formulated to aggressively stick to sheet polyethylene.

L. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

M. Flexible Duct: Spiral reinforced flex duct for air filtration devices.

N. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Protective clothing shall conform to OSHA Standard 29 CFR 1926.1101.

O. Surfactants, strippers, sealers, or any other chemicals used shall be non-carcinogenic and non-toxic.

P. Materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

2.03 TOOLS AND EQUIPMENT

A. Air Filtration Device (AFD): AFDs shall be equipped with High Efficiency Particulate Air (HEPA) filtration systems and shall be approved by and listed with Underwriter's Laboratory.

B. Scaffolding: All scaffolding shall be designed and constructed in accordance with OSHA (29 CFR 1926/1910), New York City Building Code, and any other applicable federal, state and local government regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable. All scaffolding and components shall be capable of supporting without failure a minimum of four times the maximum intended load, plus an allowance for impact. All scaffolding and staging must be certified in writing by a Professional Engineer licensed to practice in the State of New York.

1. Equip rungs of all metal ladders, etc., with an abrasive, non-slip surface.

2. Provide non-skid surface on all scaffold surfaces subject to foot traffic. Scaffold ends and joints shall be sealed with tape to prevent penetration of asbestos fibers.

C. Transportation Equipment: Transportation Equipment, as required, shall be suitable for loading, temporary storage, transit and unloading of asbestos contaminated waste without exposure to persons or property. Any temporary storage containers positioned outside the building for temporary storage shall be metal, closed and locked.

D. Vacuum Equipment: All vacuum equipment utilized in the Work Area shall utilize HEPA filtration systems.

E. Vacuum Attachments: Soft Brush Attachment, Asbestos Scraper Tool, Drill Dust Control Kit.

F. Electric Sprayer: An electric airless sprayer suitable for application of encapsulating material and shall be approved by and listed with Underwriters Laboratory.

G. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

H. Water Atomizer: Powered air-misting device equipped with a ground fault interrupter and equipped to operate continuously.

I. Brushes: All brushes shall have nylon bristles. Wire brushes are excluded from use due to their potential to shred asbestos fibers into small, fine fibers.

J. Power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation. Abrasive removal methods, including the use of beadblasters, are prohibited.

K. Other Tools and Equipment: Asbestos abatement contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, sponges, rounded-edge shovels, brooms, and carts.

L. Fans and Leaf Blower: Provide Leaf Blower (one leaf blower per floor) and one 20-inch diameter fans for each 10,000 cubic feet of Work Area volume to be used for aggressive sampling technique for clearance air testing.

M. Fire Extinguishers: At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

N. First Aid Kits: Asbestos abatement contractor shall maintain adequately stocked first aid kits in the clean rooms of the decontamination units and within Work Areas. The first aid kit shall be approved by a licensed physician for the work to be performed under this Contract.

O. Water Service:

1. Temporary Water Service Connection: All connections to the Facilities water system shall include back flow protection. Valves shall be temperature and pressure rated for operation of the temperature and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping, and equipment. Leaking or dripping fittings/valves shall be repaired and or replaced as required.

2. Water Hoses: Employ new heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each Work Area and to each Decontamination Enclosure Unit. Provide fittings as required for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

3. Water Heater: Provide UL rated 40-gallon electric water heaters to supply hot water for Personal Decontamination Enclosure System Shower. Activate from 30 Amp Circuit breakers located within the Decontamination Enclosure sub panel. Provide relief valve compatible with water heater operations, pipe relief valve down to drip pan at floor level with type 'L'

copper piping. Drip pans shall be 6-inch deep and securely fastened to water heater. Wiring of the water heater shall comply with NEMA, NECA, and UL standards.

P. Electrical Service:

1. General: Comply with applicable NEMA, NEC and UL standards and governing regulations for materials and layout of temporary electric service.

2. Temporary Power: Provide service to decontamination unit sub panel with minimum 60 AMP, two pole circuit breaker or fused disconnect connected to the building's main distribution panel. Sub panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.

3. Voltage Differences: Provide identification warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

4. Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate the GFCIs outside the Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in Work Area, decontamination units, exterior, or as otherwise required by NECA, OSHA or other authority.

5. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least subject to damage from operations.

6. Temporary Wiring: In the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Provide liquid tight enclosures or boxes for all wiring devices. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors.

7. Electrical Power Cords: Use only grounded extension cords; use hard service cords where exposed to traffic and abrasion. Use single lengths of cords only.

8. Temporary Lighting: All lighting within the Work Area shall be liquid and moisture proof and designed for the use intended.

a. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.

b. Provide lighting in the Decontamination Unit as required to supply a minimum 50-foot candle light level.

9. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

2.04 CLEANING

A. Throughout the construction period, the asbestos abatement contractor shall maintain the building as described in this Section.

1. The asbestos abatement contractor shall prevent building areas other than the Work Area from becoming contaminated with asbestos-containing dust or debris. Should areas outside the Work Area become contaminated with asbestos-containing dust or debris as a consequence of the asbestos abatement contractor's work practices, the asbestos abatement contractor shall be responsible for cleaning these areas in accordance with the procedures appended in Title 15, Chapter 1 of RCNY and NYSDOL ICR56. All costs incurred in cleaning or otherwise decontaminating non-Work Areas and the contents thereof shall be borne by the asbestos abatement contractor at no additional cost to the City.

2. The asbestos abatement contractor shall provide to all personnel and laborers the required equipment and materials needed to maintain the specified standard of cleanliness.

B. General

1. Waste water from asbestos removal operations, including shower water, may be discharged into the public sewer system only after approved filtration is on operation to remove asbestos fibers.

2. Asbestos wastes shall be double bagged in six mil fire retardant polyethylene bags approved for ACM disposal and shall be properly labeled and handled before disposal.

3. All waste generated shall be bagged, wrapped or containerized immediately upon removal. The personal and waste decontamination enclosure systems and floor and scaffold surfaces shall be HEPA vacuumed and wet cleaned at the end of each work shift at a minimum.

4. The asbestos abatement contractor shall use corrugated cartons or drums for disposal of asbestos-containing waste having sharp edged components (e.g., nails, screws, metal lathe and tin sheeting) that may tear polyethylene bags and sheeting. The waste within the drums or cartons must be double bagged.

5. The asbestos abatement contractor shall transport all bags of waste to disposal site in thirty gallon capacity metal or fiber drums with tight lids, or in locked steel dumpster.

6. Dumping of debris, waste or bagged waste will not be permitted.

7. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.

8. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.

9. ACM shall be collected utilizing rubber dust pans and rubber squeegees.

10. HEPA vacuums shall not be used on wet materials unless specifically designed for that purpose.

11. Metal shovels shall not be used within the work area.

12. Mastic solvent when used will be applied in moderation (e.g., by airless sprayer). Saturation of the concrete floor with mastic solvent must be avoided.

13. The asbestos abatement contractor shall retain all items in the storage area in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection of all materials.

14. The asbestos abatement contractor shall not allow accumulation of scrap, debris, waste material, and other items not required for use in this work. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with New York City Department of Sanitation (DSNY) regulation Title 16 Chapter 8, and Federal, State and City laws.

15. At least twice a week (more if necessary), the asbestos abatement contractor shall completely remove all scrap, debris and waste material from the job site.

16. The asbestos abatement contractor shall provide adequate storage space for all items awaiting removal from the job site, observing all requirements for fire protection and concerns for the environment.

17. All respiratory protection equipment shall be selected from the latest NIOSH Certified Equipment list.

18. Daily and more often, if necessary, the asbestos abatement contractor shall inspect the Work Areas and adjoining spaces, and pick up all scrap, debris, and waste material. All such items shall be removed to the place designated for their storage.

19. Weekly, and more often, if necessary, the asbestos abatement contractor shall inspect all arrangements of materials stored on the site; re-stack and tidy them or otherwise service them to meet the requirements of these Specifications.

20. The asbestos abatement contractor shall maintain the site in a neat and orderly condition at all times.

PART 3 – EXECUTION

3.01 WORKER DECONTAMINATION FACILITY

A. Large Asbestos Projects:

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas

a. Structure:

(1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

(2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

(3) Interior shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of 12 inches.

(4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into Work Area.

b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart. The curtained doorways shall consist of 3 overlapping sheets of fire retardant 6-mil polyethylene sheeting, with alternating entrances and weighted at the bottom.

d. Decontamination Enclosure System shall be placed adjacent to the Work Area and shall consist of three totally enclosed chambers, separated from Work Area and each other by airlocks, as follows:

(1) Equipment Room: The equipment room shall have a curtain doorway to separate it from the Work Area, and share a common airlock with the shower room. The equipment room shall be large enough to accommodate at least one worker (allowing them enough room to remove their protective clothing and footwear), and a fire retardant 6-mil disposal bag for collection of discarded clothing and equipment. The equipment room shall be utilized for the storage of equipment

and tools after decontamination using a HEPA-vacuum and/or wet cleaning. A one-day supply of replacement filters, in sealed containers, for HEPA-vacuums and negative air machines, extra tools, containers of surfactant, and other materials and equipment required for the project shall be stored here. A walk-off pan filled with water shall be placed in the Work Area just outside the equipment room for persons to clean foot coverings when leaving the Work Area. Contaminated footwear and reusable work clothing shall be stored in this room.

(2) Shower Room: The shower room shall have two airlocks (one that separates it from the equipment room and one that separates it from the clean room). The shower room shall contain at least one shower, with hot and cold water adjustable at the tap, per six workers. Careful attention shall be given to the shower to ensure against leaking of any kind and shall contain a rigid catch basin at least six inches deep. Asbestos abatement contractor shall supply towels, shampoo and liquid soap in the shower room at all times. Shower water shall be continuously drained, collected, and filtered through a system with at least a 5-micron particle size collection capacity. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filters by large particles. Pumps shall be installed, maintained and utilized in accordance with manufacturer's recommendations. Filtered water shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

(3) Clean Room: The clean room shall share a common airlock with the shower room and shall have a curtained doorway to separate it from outside non-contaminated areas. Lockers, for storage of workers' street clothing, and shelves, for storing respirators, shall be provided in this area. Clean disposable clothing, replacement filters for respirators, and clean dry towels shall be provided in the clean room. The clean room shall not be used for the storage of tools, equipment or other materials.

B. Small Asbestos Projects:

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

2. The worker decontamination enclosure system shall consist of, at a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

3. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.02 WASTE DECONTAMINATION FACILITY

A. Large Asbestos Project (Small Project Option)

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

a. Structure:

(1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

(2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8” thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

(3) Interior walls shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of 12 inches.

(4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into the Work Area.

b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart. The curtained doorways shall consist of 3 overlapping sheets of fire retardant 6-mil polyethylene sheeting, with alternating entrances and weighted at the bottom.

d. Decontamination Enclosure System shall be located outside the work area and attached to all locations through which ACM waste will be removed from the work area and shall consist of two totally enclosed chambers, separated from the Work Area and each other by airlocks, as follows:

(1) Washroom: An equipment washroom shall have two air locks (one separating the unit from the Work Area and one common air lock that separates it from the holding area). The washroom shall have facilities for washing material containers and equipment. Gross removal of dust and debris from contaminated material containers and equipment shall be accomplished in the Work Area, prior to moving to the washroom.

B. Holding Area: A holding area shall share a common air lock with the equipment washroom and shall have a curtained doorway to outside areas. A hinged, lockable door shall be placed at the holding area entrance to prevent unauthorized access into the Work Area.

C. Small Asbestos Project:

1. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

2. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

D. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.03 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING REMOTE DECONTAMINATION FACILITIES

A. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall fully identify the facility, agents, asbestos abatement contractor(s), the project, each Work Area, and worker respiratory protection employed. The asbestos handler supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

B. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear; and put on a clean respirator (with new filters) before entering the Work Area.

C. Each worker shall, before leaving the Work Area or tent, clean the outside of the respirators and outer layer of protective clothing by wet cleaning and/or HEPA-vacuuming. The outer disposable suit shall be removed in the airlock prior to proceeding to the Worker Decontamination Unit. The inner disposable suit and respirator shall be wet wiped and HEPA vacuumed thoroughly before removing and prior to aggressive shower.

D. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately.

3.04 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING ATTACHED DECONTAMINATION FACILITIES

A. All workers and authorized visitors shall enter the Work Area through the worker decontamination facility.

B. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, asbestos abatement contractor(s), the

project, each Work Area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

C. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator with filters, and clean protective clothing before entering the Work Area through the shower room and equipment room.

D. Each worker or authorized visitor shall, each time he leaves the Work Area, remove gross contamination from clothing before leaving the Work Area; proceed to the equipment room and remove clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

E. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the Work Area is not permitted outside the Work Area.

3.05 MAINTENANCE OF DECONTAMINATION ENCLOSURE FACILITIES AND BARRIERS

The following procedures shall be followed during abatement activities.

A. All polyethylene barriers inside the work place and partitions constructed to isolate the Work Area from occupied areas shall be inspected by the asbestos handler supervisor at least twice per shift.

B. Smoke tubes shall be used to test the integrity of the Work Area barriers and the decontamination enclosure systems daily before abatement activity begins and at the end of each shift.

C. Damage and defects in the decontamination enclosure system shall be repaired immediately upon discovery. The decontamination enclosure system shall be maintained in a clean and sanitary condition at all times.

D. At any time during the abatement activity, if visible emissions are observed, or elevated asbestos fiber counts outside the Work Area are measured, or if damage occurs to barriers, abatement shall stop. The source of the contamination shall be located, the integrity of the barriers shall be restored and extended to include the contaminated area, and visible residue shall be cleaned up using appropriate HEPA-vacuuming and wet cleaning.

E. Inspections and observations shall be documented in the daily project log by the asbestos handler supervisor.

F. The daily inspection to ensure that exits have been checked against exterior blockage or impediments to exiting shall be documented in the log book. If exits are found to be blocked, abatement activities shall stop until the blockage is cleared.

3.06 MODIFICATIONS TO HVAC SYSTEMS

A. Shut down, isolate or seal, all existing HVAC units, fans, exhaust fans, perimeter convection air units, supply and/or return air ducts, etc., situated in, traversing or servicing the work zone.

B. Seal all seams with duct tape. Wrap entire duct with a minimum of two layers of fire retardant 6-mil polyethylene sheeting. All shutdowns are to be coordinated with the Facility. Where systems must be maintained, i.e., traversing Work Areas to non-Work Areas, only supply ducts will be maintained, protect as described above. All returns must be blanked off in Work Area and adjacent areas, including floor above and below Work Area. When required Asbestos abatement contractor shall apply for a clarification from NYCDEP. The Asbestos abatement contractor shall implement the following engineering procedures:

1. Maintenance of a positive pressure within the HVAC system of 0.01 inch water gauge (or greater) with respect to the ambient pressure outside the Work Area. The conditions for this system shall be maintained and be operational 24 hours per day from the initiation of Work Area preparation until successful final air clearance. Positive pressurization of HVAC system shall be applied only under the direction and control of professional engineer, or other knowledgeable licensed professional;

2. The positive pressurization of the duct shall be tested, inspected and recorded both at the beginning and at the end of each shift;

3. The positive pressurization shall be monitored using instrumentation which will provide a written record of pressurization and that will trigger an audible alarm, if the static pressure falls below the set value;

4. The supply air fan and the supply air damper for the active positive-pressurized duct shall be placed in the manual “on” positions to prevent shutdown by fail-safe mechanisms;

5. The return air fan and the return air dampers shall be shut down and locked-out;

6. All the seams of the HVAC ducts that pass through the Work Area shall be sealed;

7. The HVAC ducts that pass through the Work Area shall be covered with two (2) layers of fire retardant 6-mil polyethylene sheeting, and all seams and edges of both layers shall be sealed airtight;

8. The supply air fans, return air fans, and all dampers servicing the Work Area itself shall be shut down and locked-out. All openings within the Work Area of supply and return air ducts shall be sealed with 3/8-inch fire rated plywood and two layers of fire retardant 6-mil polyethylene;

9. When abatement occurs during periods while the HVAC system is shut down an alternative method of pressurization of the duct passing through the Work Area should be employed (e.g., by low-pressure "blowers", etc., directly coupled into the duct). Item #4 above shall be deleted and shall be replaced by the requirement to set the dampers of the HVAC duct in the manual closed positions, in order to effect pressurization.

C. Asbestos abatement contractor to coordinate this item with the Facility and Construction Project Manager at the commencement of work. Where present HVAC systems (ducts) service an area and that air system cannot be shut down, asbestos abatement contractor shall isolate and seal the ducts, both supply and return, at the boundary of that zone.

1. To isolate, cap, or seal a duct, the asbestos abatement contractor shall remove insulation from duct (if necessary), then disconnect linkage to fold shut all fire dampers. Asbestos abatement contractor shall seal all edges and seams with caulk and duct-tape.

2. Asbestos abatement contractor shall then cut existing duct and fold metal in and secure with approved fasteners. Asbestos abatement contractor shall caulk and duct-tape all seams and edges.

3. All ducts shall then be completely wrapped and sealed with duct-tape and three (3) layers of reinforced polyethylene sheeting.

4. All ducts shall be restored to original working order at the end of the project.

D. Where present HVAC systems (ducts) service occupied areas (non-Work Areas), the Asbestos abatement contractor shall blank off the ducts.

1. To isolate or seal the return duct, the asbestos abatement contractor shall remove any insulation (if necessary) from the duct. Then disconnect linkage to fold shut all fire dampers and insert a fiberglass board within the duct. Asbestos abatement contractor shall seal all edges and seams with caulk, duct-tape and three (3) layers of reinforced polyethylene sheeting.

2. All isolation of return ducts and any other activity that requires removal of ceiling by the asbestos abatement contractor shall be conducted under controls. Work is to be coordinated with the Construction Project Manager and the Facility and is described as follows:

   a. Work shall occur as scheduled.

   b. Horizontal surfaces near the blanking operations shall be protected with fire retardant 6-mil polyethylene sheeting.

   c. Plastic drapes shall be used to enclose the immediate area.

   d. Asbestos abatement contractor to position and operate air filtration devices and HEPA-vacuums in the area to clean space after blanking operations.

   e. All personnel involved with this work shall receive personal protection (i.e., respirators and disposable suits).

E. Upon loss of negative pressure or electric power, all work activities in an area shall cease immediately and shall not resume until negative pressure and/or electric power has been fully restored. When a power failure or loss of negative pressure lasts, or is expected to last, longer than thirty (30) minutes, the following sequence of events shall occur.

   1. All make up air inlets shall be sealed airtight.

   2. All decontamination facilities shall be sealed airtight after evacuation of all personnel from the Work Area.

   3. All adjacent areas shall be monitored for potential fiber release upon discovery of and subsequently throughout, power failure.

3.07 LOCKOUT OF HVAC SYSTEMS, ELECTRIC POWER, AND ACTIVE BOILERS

Prior to the start of any prep work, the asbestos abatement contractor shall employ skilled tradesmen with limited asbestos licenses for the following work:

A. Disable all ventilating systems or other systems bringing air into or exhausting air out of the Work Area. Disable system by disconnecting wires removing circuit breakers, by lockable switch or other positive means to ensure against accidental re-starting of equipment.

B. Lock out power to the Work Area by switching off all breakers and removing them from panels or by switching and locking entire panel. Label panel with following notation: “DANGER CIRCUIT BEING WORKED ON”. Give all keys to Facility.

C. Lock out power to circuits running through Work Area whenever possible by switching off and removing breakers from panel. If circuits must remain live, the Facility shall notify asbestos abatement contractor in order that he may secure a variance from NYCDEP. The asbestos abatement contractor shall protect all conduit and wires to remain and label all active circuits at intervals not to exceed 3 feet with tags having the following notation: “DANGER LIVE ELECTROCUTION HAZARD”. The asbestos abatement contractor shall label all circuits in all locations including hidden locations that may be affected by the work in a similar manner.

D. All boilers and other equipment within the work area shall be shut down, locked out, tagged out and the burner/boiler/equipment accesses and openings shall be sealed until abatement activities are complete. If the boiler or other exhausted equipment will be subject to abatement, all breeching, stacks, columns, flues, shafts, and double-walled enclosures serving as exhausts or vents shall be segregated from the affected boiler or equipment and sealed airtight to eliminate potential chimney effects within the work area.

PART 4 – PREPARATION OF WORK AREA AND REMOVAL PROCEDURES

4.01 REMOVAL OF ASBESTOS-CONTAINING MATERIAL

A. Asbestos abatement contractor Responsibility

Asbestos abatement contractor shall be responsible for the proper removal of ACM from the Work Area using standard industry techniques. The Third-Party Air Monitor representative shall observe the Work.

1. General Requirements:

   a. Removal of ACM shall be performed using wet methods. Dry removal of ACM is prohibited.

   b. Spray ACM with amended water with sufficient frequency and quantity to enhance penetration. Sufficient time shall be allowed for amended water to penetrate the material to the substrate prior to removal. All ACM shall be thoroughly wetted while work is being conducted.

   c. Accumulation of standing water on the floor of the Work Area is prohibited.

d. Apply removal encapsulants, when used, in accordance with the manufacturer's recommendations and guidelines.

e. Containerize ACM immediately upon detachment from the substrate. Alternately, ACM may be dropped in to a flexible catch basin and promptly bagged. Detached ACM is not permitted to lie on the floor for any period of time. Excess air within the bag shall be removed before sealing. ACM shall not be dropped from a height of greater than 10 feet. Above 10 feet, dust free inclined chutes may be used. Maximum inclination from horizontal shall be 60-degrees for all chutes.

f. Exits from the work area shall be maintained, or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

g. Signs clearly indicating the direction of exits shall be maintained and prominently displayed within the work area.

h. No smoking signs shall be maintained and prominently displayed within the work place.

i. At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

j. If the containment area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors the cut off switch shall be able to turn off the equipment on all floors.

B. Removal of ACM Utilizing Full Containment Procedures shall be as follows:

1. Preparation Procedures:

a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.

b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of fire-retardant polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos contaminated waste.

c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.

d. Provide and install decontamination enclosure systems in accordance with Sections 3.01 and 3.02 of this Section.

e. Remove ACM that may be disturbed by the erection of partitions using tent procedures and wet removal methods. Removal shall be limited to a one-foot wide strip running the length/height of the partition.

f. Pre-clean and remove moveable objects from the Work Area. Pre- cleaning shall be accomplished using HEPA-vacuum and wet- cleaning techniques. Store moveable objects at a location determined by the City.

g. Protect carpeting that will remain in the Work Area.

(1) Pre-clean carpeting utilizing wet-cleaning techniques.

(2) Install a minimum of two layers of fire retardant 6-mil reinforced polyethylene sheeting over carpeting.

(3) Place a rigid flooring material, minimum thickness of 3/8-inch, over polyethylene sheeting.

h. Pre-clean all fixed objects to remain within the Work Area using HEPA-vacuum and wet-cleaning techniques.

i. Seal fixed objects with two individual layers, minimum, of 6-mil fire retardant polyethylene sheeting.

j. Pre-clean entire Work Area utilizing HEPA-vacuum and wet-cleaning techniques. Methods of cleaning that raise dust; such as dry sweeping or use of vacuum equipment not equipped with HEPA-filters, is prohibited.

k. Install isolation barriers (i.e., sealing of all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and other penetrations within the Work Area) using two layers of 6-mil fire retardant polyethylene sheeting and duct-tape.

l. Construct rigid framework to support Work Area barriers.

(1) Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inches on center when existing walls and/or ceiling do not exist for all openings greater than 32 square feet. Framework is not required except where one dimension is one foot or less or the opening will be used as an emergency exit.

(2) Apply a solid construction material, minimum thickness of 3/8- inch to the Work Area side of the framing. In secure interior areas, not subject to access from the public or building occupants, an additional layer of 6-mil fire retardant polyethylene sheeting may be substituted for the rigid construction material.

(3) Caulk all wall, floor, ceiling, and fixture joints to form a leak tight seal.

m. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of 6-mil fire retardant plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the asbestos abatement contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.

n. Remove ceiling mounted objects not previously sealed that will interfere with removal operations. Mist object and surrounding ACM with amended water prior to removal to minimize fiber dispersal. Clean all moveable objects using HEPA-vacuum and wet-cleaning techniques prior to removal from the Work Area.

o. Fiberglass insulation with intact coverings shall be protected in place during abatement activities. These materials shall be protected with two layers of 6-mil fire retardant polyethylene sheeting as isolation barriers and two additional layers of 6-mil fire retardant polyethylene sheeting serving as primary and secondary surface barriers.

p. Install and initiate operation of Air Filtration Devices (AFD)s to provide a negative pressure and a minimum of four air changes per hour within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuum to produce a negative air pressure inside the enclosure is prohibited.

q. Maintain emergency and fire exits from the Work Area or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

r. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.

s. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.

t. Prior to being plasticized, the Work Areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.

u. Plasticize the area after pre-cleaning, using the following procedures.

(1) Cover floors with one layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 6 inches up wall, and seal layer to wall.

(2) Cover walls with one layer of 6-mil fire retardant polyethylene sheeting, overlapping wall layer a minimum of 6 inches, and seal layer to floor layer.

(3) Cover floors with a second layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.

(4) Cover walls with a second layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.

(5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.

(6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM waste as described in this Specification.

(7) Repeat preparation of areas accessed by demolition activities as described above.

v. Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.

w. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.

x. Means of egress shall not be obstructed by hard wall barriers.

y. Pre-Removal Inspections.

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Within Full Containment:

   a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

   b. Remove the material using hand tools such as scrapers or putty knives. Wire-mesh or wood lathe reinforcing, when present, shall be cut into manageable pieces and disposed of as ACM.

   c. Remove any residual material from the substrate using wet cleaning methods and nylon-bristled hand brushes.

   d. Place the removal material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

   e. Following the completion of removal of insulation, all visible residue shall be removed from the substrate.

3. Following Removal of ACM utilizing Full Containment Procedures:

   a. First Cleaning:

      (1) Remove any visible accumulation of asbestos material and debris. HEPA-vacuuming and wet cleaning shall be performed on all surfaces inside the Work Area. All sealed drums, plastic bags, and equipment used in the Work Area shall be removed from the Work Area.

      (2) Upon request of the asbestos abatement contractor, the Third- Party Air Monitor will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

      (3) Remove first layer of plastic sheathing inside the Work Area. The isolation barriers and decontamination facility shall remain in place and be utilized.

   b. Second Cleaning:

      (1) After the first cleaning, the Work Area shall be vacated for twelve hours to allow fibers to settle.

(2) All objects and surfaces in the Work Area shall be HEPA - vacuumed and wet cleaned for a second cleaning.

(3) A thin coat of lockdown encapsulant shall be applied to all plastic covered surfaces in the Work Area.

(4) When the encapsulant is dry, second layer of polyethylene sheeting on the walls, ceiling and floors shall be removed. Do not remove seals from doors, windows, Isolation Barriers or disconnect the negative pressure equipment.

c. Third Cleaning:

(1) A minimum of four hours after the second cleaning, all the surfaces in the Work Area shall be HEPA-vacuumed and wet cleaned for a third cleaning.

(2) Upon the request of the asbestos abatement contractor, the Third-Party Air Monitor will do final visual inspection for re- occupancy. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

(3) When the Work Area passes the Third-Party Air Monitor's visual re-occupancy inspection, air sampling shall not begin until at least one hour after the completion of the third cleaning. The Third-Party Air Monitor shall perform air monitoring using aggressive testing techniques. The Third- Party Air Monitor will approve re-occupancy if the specified fiber count in the Work Area is achieved according to the Third-Party Air Monitor.

(4) When the Work Area passes the re-occupancy test, all controls and seals established shall be removed.

(5) The cleaned layer of the surface barriers shall be removed from walls and floors.

(6) The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but

excepting sprinklers, standpipes, and other active elements of the fire suppression system.

d. Final Barrier Removal:

(1) Upon receipt of acceptable clearance testing results, polyethylene sheeting and Isolation Barriers shall be removed and disposed accordingly as asbestos-containing material.

(2) The area surrounding the abatement workplace shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

e. The Third-Party Air Monitor will conduct a final visual observation. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization.

C. Removal of ACM Roofing and Flashing Materials utilizing NYC DEP § 1-107 Foam Procedure for Roof Removal shall be as follows:

1. Preparation procedures:

a. These procedures apply only to the removal of asbestos-containing roofing material (ACRM) from exterior roof surfaces. The work area on the roof shall be cordoned off with clearly visible barriers such as caution tape, and only authorized persons shall have access.

b. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection for handling, and shall not affect the handling and disposal of the waste.

c. The foam or viscous liquid shall coat and maintain a stable blanket (minimum 1" thickness) for the duration of the removal process and shall leave an identifiable colored residue when it dissipates.

d. The foam or viscous liquid shall wet the ACRM. The ACRM shall be kept wet through the bagging process.

e. Persons entering the work area shall wear correctly-fitting, good traction rubber boots.

f. Abatement shall not be carried out during adverse weather conditions (e.g., precipitation, high winds, ambient temperature below 32 degrees Fahrenheit, etc.).

g. The worker decontamination unit may be attached to each work area at an entry/exit from each work area, or may be remote, in which case it shall be equipped with an airlock at the entrance. In addition to the shower head(s), the shower room shall be equipped with a flexible hose for waste decontamination for removal of less than 1,000 square feet of ACRM. For 1,000 square feet or more of ACRM removal, a separate waste decontamination facility shall be located at an entry/exit from each work area. Remote holding areas for the asbestos containing waste shall comply with Title 16, Chapter 8, Rules of the City of New York (16 RCNY 8 et. seq.).

h. Movable objects shall be removed from the work area, or kept in place and wrapped in one sheet of fire retardant 6 mil plastic sheeting.

i. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings shall be sealed with 2 layers of fire retardant 6 mil plastic or fitting with HEPA filters when appropriate. Temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange instead of sealing vents, air intakes, etc., with 2 layers of plastic or HEPA filters. Drains may be equipped with 5 micron filtering system in lieu of being sealed.

j. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop appurtenances shall be covered in one sheet of fire retardant 6 mil plastic up to a height of at least six feet.

k. The asbestos abatement contractor shall be responsible for protection of the interior spaces beneath the roof.

l. All office equipment and furniture, including but not limited to desks, chairs, computers, printers, cabinets, etc., carpeted and wooden floors shall be covered with one layer of 6- mil plastic sheeting.

m. The asbestos abatement contractor shall be responsible for any damage that may occur in the interior spaces, including but not limited to office equipment, furniture, floors, etc., beneath the roof during all phases of the roof abatement.

n. The asbestos abatement contractor shall provide temporary roof protection consisting of 10-mil polyethylene sheeting following abatement over the open roof areas. Strict coordination with the General Asbestos abatement contractor, Construction Project Manager and/or Architect is required and necessary during this phase of abatement.

o. Preliminary examination shall be conducted and precautions shall be taken to prevent damage to the interior of the building, including but not limited to office equipment, furniture, carpeted and wooden floors, etc., and to ensure no adverse effect on the structural stability of the roof due to the abatement activity.

p. Abatement activities shall not be carried out during adverse weather conditions (e.g., precipitation, heavy winds, etc.).

q. The floor area between the remote decontamination facility and the Work Area must be protected with 2 layers of 6-mil. polyethylene sheeting suitably anchored.

r. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings are to be sealed with two layers of 6-mil plastic or fitted with HEPA-filters where appropriate. In lieu of sealing vents, air intakes, etc., with two layers of plastic or HEPA-filters, temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange. Drains may be equipped with 5 micron filtering systems in lieu of being sealed.

s. Pre-Removal Inspections:

(1) Prior to removal of any ACM, the Asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor’s approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Roofing and Flashing Materials:

   a. The asbestos abatement contractor shall be responsible for the removal of all roofing components, including multiple layers of built-up membrane, tar, vapor barrier and/or flashing down to the substrate/deck.

   b. Prior to actual removal, the built-up roofing shall be blanketed and wetted with a minimum 1" coating of the acceptable foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged. The foam or viscous liquid shall be confined to the work area.

   c. Hand-held power tools used to drill, cut into, or otherwise disturb the ACRM shall be equipped with the HEPA-filtered local exhaust ventilation and operated to prevent potential fiber release.

   d. Abatement shall not be performed in adverse weather conditions (e.g., precipitation, heavy winds, etc.). Asbestos abatement contractor shall protect all exposed roof during adverse weather conditions.

   e. Portable HEPA-vacuum machines shall be available during abatement.

   f. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed, and then wet-cleaned and transferred into the shower room for double bagging. The double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.

3. Following Removal of ACM Roofing and/or Flashing:

   a. Upon completion of the abatement in roof work area, clean-up procedures shall involve removal and bagging of:

   b. The asbestos containing roofing material (ACRM)

   c. Visible accumulations of asbestos containing waste

   d. All excess foam or similar viscous liquid

   e. All debris, and shall be followed by a thorough wet cleaning.

   f. All tools shall be wet cleaned and HEPA-vacuumed, and then removed from the work area upon completion.

g. Following the removal of all debris, the work area shall be thoroughly wet cleaned. The work area shall be allowed to dry completely before the visual inspection is conducted. The inspection shall confirm the absence in the work area of:

(1) ACM, debris, bagged ACM waste,

(2) Excess foam or other viscous liquid.

h. If the work area fails visual inspection, it shall undergo another wet cleaning and/or HEPA vacuuming until it passes the visual inspection.

i. When the visual inspection and clearance testing is successful, all plastic may be removed.

j. Air monitoring shall be conducted in accordance with the relevant provisions of Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule.

D. Removal of ACM from Vertical Exterior Surfaces utilizing NYCDEP Title 15, Chapter 1 §1-109 Abatement from Vertical Exterior Surfaces procedures shall be as follows:

Preparation procedures: This procedure shall apply to the abatement of asbestos-containing materials from vertical exterior surfaces such as, but not limited to caulking or glazing compounds, asphaltic materials or tar, cement siding or shingles (including transite), paints, sealants coping stone caps or clay roof tiles.

a. The entire surface to be abated and ground-level perimeter shall be considered the work area unless partitions and warning tape are used to define the work area.

b. A restricted area shall be established using warning tape extending at least 25 feet from the affected areas of the building or to the nearest vertical obstruction or the curb.

c. The restricted area may be entered only by certified workers or authorized visitors.

d. Before plasticizing, the restricted area shall be inspected for ACM debris and, if necessary, pre-cleaned using HEPA vacuums and wet methods.

e. All openings to the building or structure's interior which are within 25 feet of the affected ACM shall be closed and sealed.

f. Scaffolding erected to access the ACM shall be constructed, maintained, and used in accordance with applicable federal, state, and city laws.

g. Horizontal surfaces beneath the affected ACM shall be covered with two layers of fire-retardant 6-mil plastic to a width of six feet.

h. Elevated platforms being used to access the affected ACM shall be plasticized with two layers of fire-retardant 6-mil plastic, which shall extend up from the platform to at least the height of the mid-rail on three sides and shall be attached directly to the building just below the surfaces under abatement.

i. The ground-level restricted area shall be cleared of all moveable objects and plasticized with two sheets of fire-retardant 6-mil plastic, which shall be extended one foot up the side of the building. The plasticized area shall be ten feet wide for every floor up to a maximum width of thirty feet, or to the curb. This plastic shall be cleaned, replaced, and disposed of as asbestos waste at the end of each shift.

j. Sidewalk bridges in the restricted area shall be covered with two layers of fire retardant 6-mil plastic, placed over and secured to the bridge, spread across the full width, draped over the side to ground level, and extended to a width of at least thirty feet.

k. Establish a remote decontamination unit in accordance with Section 3.01 within the restricted area.

l. Construct all elevated work platforms a minimum of one foot below the surface to be abated.

m. Pre-Removal Inspections

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Project Monitor and request a pre- removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Project Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Materials:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the caulk using hand tools such as knives or scrapers.

c. Exercise caution when removing caulking material to prevent damage to windows or skylight openings.

d. Remove any residual asbestos-containing caulking material from the substrate using wet cleaning methods and nylon-bristled hand brushes. The use of metal bristled brushes is prohibited.

e. Place the removed material immediately into a properly labeled 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

f. Following the completion of removal of caulking, all visible residues shall be removed from the substrate.

g. Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule. This sampling shall be performed by the Third-Party Air Monitoring Firm.

3. Following Removal of ACM:

a. The stripped substrate shall be HEPA vacuumed and wet-wiped.

b. A visual clearance inspection shall be conducted by the asbestos handler supervisor and project monitor after the work area dries, to ensure the absence of ACM residue or debris in the work area.

c. After the inspection is completed, the warning tapes and barriers may be removed.

d. The clearance inspection shall be documented in the log and the project air sampling log.

e. Air monitoring shall be conducted in accordance with relevant provisions.

f. Asbestos abatement contractor shall request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.

g. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.

h. If the Work is accepted by the Third-Party Air Monitor based on the inspection, asbestos abatement contractor shall be notified. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations:

(1) All waste shall be removed from the Work Area and holding areas.

(2) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.

i. If the Work is not approved, the Third-Party Air Monitor will inform Asbestos abatement contractor who will then HEPA-vacuum and/or wet-clean the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.

j. Final Barrier Removal

(1) Upon receipt of acceptable observation results, polyethylene sheeting and barrier tape shall be removed and disposed accordingly as ACM.

(2) The area surrounding the abatement workplace shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

(3) The Third-Party Air Monitor will conduct final visual inspection. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.

4.02 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

A. Ensure that barriers are installed in a manner appropriate to the expected weather conditions during the project and for its duration. Repair damaged barriers and remedy defects immediately upon their discovery. Visually inspect barriers at the beginning and end of each work period.

B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of two times for each 8-hour work shift.

PART 5 – ASBESTOS WASTE MANAGEMENT

5.01 ACM WASTE REQUIREMENTS

A. The asbestos abatement contractor and all sub-asbestos abatement contractors are specifically alerted to the illegal practice of combining asbestos-containing waste (ACW) from one project with the ACW of other projects without using the services of a permitted waste transfer station as defined by 6 NYCRR Part 360 and 364. As part of the shop drawing submittals, the asbestos abatement contractor must submit for approval the proposed method of transportation and disposal that will be utilized to manage the ACW of this Contract. If a permitted transfer station is to be used, the cost shall be included in the work. The asbestos abatement contractor must submit a waste manifest consistent with whatever approved method is utilized as part of the invoicing and payment procedures.

B. The asbestos abatement contractor shall maintain compliance with the strictest set of regulations of Title 15, Chapter 1 of RCNY, NYC LL 70/85, NYS DOL ICR 56, USEPA, Asbestos Regulation 40 CFR Section 61.152, 29 CFR 1926.1101, 29 CFR 1910.1200 (F) of OSHA's Hazard Communication Standards, and other applicable standards.

NOTE: Any penalties incurred for failure to comply with any of the above regulations will be the sole responsibility for fines imposed due to negligence of the Asbestos abatement contractor.

C. When presenting ACW for storage at the generation site, the asbestos abatement contractor shall:

1. Wet down ACW in a manner sufficient to prevent all visible emissions of dust into the air.

2. Seal material in a leak tight container while wet.

3. Keep ACW separate from any other waste.

D. When presenting ACW for storage away from the site of generation, the Asbestos abatement contractor shall:

1. Ensure that ACW has been properly packaged as per requirements above.

2. Examine the containers of ACW to ensure that there are no breaks in the containers and that no visible dust is being released into the air.

3. If examination reveals damage to a container of ACW the Asbestos abatement contractor or person accepting the waste shall immediately wet down the ACW and repackage it into a clean leak tight container. The subsequent repackaging shall be the financial responsibility of the Asbestos abatement contractor and occur at no extra cost to the City.

4. Keep ACW separate from any other waste.

E. When storing ACW – The Asbestos abatement contractor shall:

1. Ensure that the ACW has been sufficiently wetted down in tight containers.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

6. Keep ACW in a secured, enclosed, and locked container.

7. If the asbestos abatement contractor has intention of sorting a quantity of ACW greater than or equal to 50 cubic yards, the Asbestos abatement contractor shall:

a. Submit a written request and receive written approval from the City.

F. When presenting for transport, the asbestos abatement contractor shall:

1. Ensure that ACW has been sufficiently wetted down.

2. Examine the integrity of the container's airtight seal.

3. Re-wet and repackage any damaged containers.

4. Keep ACW separate from all other waste.

5. Ensure that a person transporting asbestos waste holds a valid permit issued pursuant to law.

6. Frequency of Waste Removal:

a. Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site without written approval from the City. The Waste Hauler and landfill shall be as indicated on the notifications to regulatory agencies.

G. Waste Load-out Through Equipment Decontamination Enclosure (Full Decontamination Facility): Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick polyethylene sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA-vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the equipment washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil polyethylene sheeting, as the item's physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.

1. The clean containerized items shall be moved to the equipment decontamination enclosure holding area pending load-out to storage or disposal facilities.

2. Workers who have entered the equipment decontamination enclosure system from the uncontaminated non-Work Area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers moving asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.

3. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

4. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, including those turned “inside-out”, shall be handled and disposed of as ACM waste.

H. All asbestos materials, wastes, shower water, polyethylene, disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York Department of Environmental Conservation and New York City Department of Sanitation.

I. All asbestos materials shall be prepared for transportation in accordance with this specification and all applicable Federal, State, County and City Regulations. asbestos abatement contractor shall submit the following documentation:

1. Where applicable, an EPA Generator's identification number which has been obtained from the EPA for all asbestos waste generated from the project.

2. Applicable State Waste Hauler license and registration numbers.

3. Federal Hazardous Materials Waste Hauler number.

4. Designated landfill EPA Permit numbers.

J. Prior to loading asbestos waste the enclosed cargo areas (dumpster) shall be prepared as follows:

1. Clean via HEPA-vacuum and wet wipe techniques the enclosed cargo areas of all visible debris prior to preparing with polyethylene.

2. Line the cargo area with two layers of 6-mil polyethylene sheeting to prevent contamination from damaged or leaking containers. Floor sheeting shall be installed first and extend up the walls a minimum of 24-inches. Wall sheeting shall be overlapped and taped securely into place.

K. Asbestos-containing waste shall be placed on level surfaces in the cargo area of the dumpster and shall be packed tightly to prevent any shifting or tipping of the waste during transportation.

L. Asbestos-containing waste shall not be thrown into or dropped from the dumpster. All material shall be handled carefully to prevent rupture of the containers.

M. All personnel engaged in handling and loading of asbestos contaminated waste outside of the Work Area shall wear protective clothing. The disposable clothing shall include head, body and foot protection and color of clothing shall be different from abatement personnel in the Work Area. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters.

N. Asbestos abatement contractor shall immediately clean debris or residue observed on containers or surfaces outside of the Work Area. Cleaning shall be via HEPA equipped wet/dry vacuums only.

O. All asbestos-containing waste shall be transported from the abatement site to the landfill by a registered Waste Hauler. When transporting ACW:

1. Ensure that the ACW has been sufficiently wetted down in a leak tight container.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

P. Keep ACW in a secured, enclosed, and locked container.

Q. Waste transport documents shall conform to the requirements of the U.S. Department of Transportation, Hazardous Materials Transportation Regulation, 49 CFR Part 173 and EPA 40 CFR 61.150 (d)(1)(2). Shipping documents shall be clearly marked with the required designation "RQ Asbestos". Asbestos abatement contractor shall provide a copy of this document to the City.

R. A uniform hazardous waste manifest shall be prepared by the asbestos abatement contractor and signed by the asbestos abatement contractor each time the asbestos abatement contractor ships a dumpster load of Asbestos-Containing Waste Material. The uniform hazardous waste manifest shall include the site of waste generation, the names and addresses of the Transporter, the asbestos abatement contractor, and the landfill operator with information on the type and number of asbestos-waste containers, time and date. Asbestos abatement contractor shall provide the Construction Project Manager, Third-Party Air Monitor or authorized designated representative with signed copies of the waste manifest before each departure.

S. Asbestos abatement contractor or his/her Waste Hauler shall transport asbestos-containing waste material from the abatement site directly to the specified disposal site. Asbestos abatement contractor or their Waste Hauler shall not accept material

from any other site when transporting asbestos-containing waste material from the abatement site. The authorized DDC representative or Construction Project Manager reserves the right to travel with asbestos abatement contractor's Waste Hauler to the waste disposal site. No intermediate storage of waste material (i.e., asbestos abatement contractor's warehouse) shall be permitted.

T. Final or progress application for payments will not be processed unless all hazardous waste manifests generated to date have been received and reviewed by the Construction Project Manager.

U. All asbestos materials, wastes, shower water, polyethylene disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York State Department of Environmental Conservation and the New York Department of Sanitation.

V. Asbestos abatement contractor shall transport all sealed drums to a landfill disposal site approved by the Department of Environmental Conservation and the EPA. Transportation shall be performed by a New York State registered Waste Hauler, where required. When presenting the ACW for disposal the Asbestos abatement contractor or sub Asbestos abatement contractor shall:

1. Ensure that waste container is properly labeled according to the National Emission Standard for Hazardous Air Pollutants (NESHAP); Asbestos Revision, 40 CFR, Part 61, Subpart M. The labels shall include the name of the waste generator and the location where the waste was generated.

2. Comply with all applicable orders issued pursuant to asbestos disposal.

3. Ensure that ACW has been sufficiently wetted down.

4. Re-wet and repackage any damaged containers.

5. Keep ACW separate from all other wastes.

W. Asbestos abatement contractor shall notify the waste disposal site, at least 24 hours prior to transportation of asbestos contaminated waste to be delivered. Asbestos abatement contractor shall determine if a larger notification period is required.

X. At the site asbestos abatement contractors or Waste Hauler trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.

Y. Asbestos abatement contractor or Waste Hauler shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.

Z. Asbestos abatement contractor or Waste Hauler shall not remove asbestos-containing waste Material from drums unless required to do so by the disposal site City. Used drums shall be disposed of as asbestos-asbestos contaminated waste.

AA. All personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters. Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave them with the deposited waste shipment.

BB. For the compaction operation, the asbestos abatement contractor shall ensure that disposal sites personnel have been provided with personal protective equipment by the disposal operator. If the disposal site City has not provided this protective equipment, the asbestos abatement contractor shall supply protective clothing and respiratory protection for the duration of this operation (PAPR respirators are mandatory).

CC. If containers are broken or damaged, the asbestos abatement contractor or Waste Hauler shall, using personnel who are properly trained and wearing proper protective equipment, shall repackage the waste in properly labeled containers. Asbestos abatement contractor shall then clean the entire truck and its contents using HEPA-vacuums and wet cleaning techniques until no visible residue is observed.

DD. Following the removal of all containerized waste, the asbestos abatement contractor shall decontaminate the truck cargo area using HEPA-vacuums and/or wet cleaning techniques until no residue is observed. All 6-mil polyethylene sheeting shall be removed and discarded as asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.

EE. The transporter(s) of all asbestos waste shall not back-haul any items on his return from landfill/disposal site.

FF. All asbestos waste shall be disposed of in an approved Asbestos Landfill site only.

1. NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ACW. The same shall be disposed of only by certified persons in approved landfills.

2. A manifest form will be signed by the Landfill documenting receipt and acceptance of the asbestos-containing waste. This manifest will be furnished to the City of New York within thirty calendar days from the project completion date.

3. It is the responsibility of the Asbestos abatement contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Asbestos abatement contractor must comply fully with these regulations and all appropriate U.S. Department of Transportation, EPA and other Federal, State and Local entities' regulations and all other current legal requirements.

4. The asbestos abatement contractor shall obtain an agreement from the transporter (s) that the practice of "Back-Hauling" will not be engaged in, with respect to any and all waste loads taken from this site during the work.

5. The asbestos abatement contractor will document actual disposal of the waste at the designated landfill by having completed a Disposal Certificate and will provide a copy of the same to the Department of Design and Construction.

PART 6 – ACCEPTANCE

6.01 ACCEPTANCE

Upon satisfactory completion of all decontamination procedures, a certificate will be issued by the Construction Project Manager with copies to all parties.

A. A letter of Compliance stating that all the work on the project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations.

B. All warranties as stated in the Specifications.

END OF SECTION 02 82 13

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 but is not limited to the following as shown on the drawings and as specified herein:

1. Foundation systems including pile caps, walls, architecturally exposed and insulated walls, mud slabs, beams, pilasters, pits and similar concrete.
2. Slabs on grade.
3. Structural slabs on grade.
4. Structural slabs on metal deck.
5. Cast-in-place slabs, beams, walls, and columns.
6. Topping slabs
7. Stair pan fills.
8. Furnishing and installing all required anchors and inserts.
9. Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other subcontractors for casting into the concrete and cleaning of same after stripping of forms.
10. 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.
11. 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.
12. Erection and removal of all formwork required to properly complete the work.
13. Finishing of all concrete work as hereinafter specified.
14. Curing and protection of all concrete work.
15. Site concrete consisting of walls, pads, boxes and the like as shown on the drawings.
16. Floor sealers and dust-proofing of all areas exposed and/or covered with carpet.
17. Cutting, patching, grouting, repairing and pointing up as required.
18. Under slab drainage course.
19. Grouting of all beam bearing plates and column base plates.
20. Embedded plates in all foundation walls.
21. Equipment pads as required.
22. All other work and materials as may be reasonably inferred and needed to make the work of this section complete.

B. Related Sections:

1. Section 04 20 00 “Unit Masonry”
2. Section 05 12 00 “Structural Steel Framing”
3. Section 05 31 00 “Steel Decking”
4. Section 05 50 00 “Miscellaneous Metals”
5. Section 06 10 00 “Rough Carpentry”
6. Section 07 13 26 “Sheet Membrane Waterproofing”
7. Section 07 92 00 “Joint Sealers”

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Product Data: Submit data for materials and items, including the following:

1. Reinforcement
2. Supports for reinforcement
3. Forming accessories
4. Admixtures
5. Patching compounds
6. Waterstops
7. Joint systems
8. Curing compounds
9. Dry-shake finish materials
10. Others items as requested by 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 shall be prepared only by competent detailers, checked by the contractor prior to submission.

1. The shop drawings shall 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 subcontractors. 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.
5. Show walls to be insulated.

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 shall be by the Contractor, 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 and submitted for approval by the Commissioner.

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. Scaling of the Commissioner's drawings is not permitted. This applies to hard paper, electronic, and all other versions.

H. Samples: Submit samples of materials as requested by Commissioner, including names, sources and descriptions.

I. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.

J. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Commissioner. Manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall sign material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

K. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures (as per descriptions provided in the "Concrete Placement" section), when applicable.

L. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.

M. 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.

N. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.

O. 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

P. 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".

Q. Material compatibility submittal: see section 3.14 E.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

1. The contractor or subcontractor performing the work of this section must, within the last three (3) consecutive years prior to the bid opening have successfully complete in a timely fashion projects similar in scope and type to the required work.

C. 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.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

E. 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, Latest Edition
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 306R-10 "Guide to 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 shall be kept at the job site, and the practices set forth therein shall be strictly adhered to.
24. ASTM Standards as applicable in the New York City Building Code and as noted in this specification.
25. AASHTO T 318, “Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.”

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, shall 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 shall 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 shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
2. The Contractor shall 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 shall be recorded, typed and printed by the contractor and distributed by the contractor to all parties concerned within 5 days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Commissioner
4. The minutes shall 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 shall be placed at the job site using the accepted methods of placing, finishing and curing. All applicable tests including slump, strengthen, air content, permeability, and air content will be performed. This shall occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors shall 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. Test sample will be for defining finish, form jointing and tie location. Provide separate pre-construction mock-ups for CONC-02 and CONC-03 to review the insulated poured in place wall as well as the exposed finish of the lot line wall.

6. The Commissioner will be present at the conference. The Contractor shall notify the Commissioner at least 10 days prior to the scheduled date of the conference.

1.5 PROJECT CONDITIONS

A. The Contractor, before commencing work, shall 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 shall 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 Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.

E. Procedure of Work: The contractor shall keep themselves constantly informed as to the progress of the work in the field, materials and workers 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 contractors, and in any event the contractor shall, 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.
2. For concrete type CONC-02 and CONC-03 use MDO formwork, stainless steel screw ties with plastic cone and set back plug.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Preference shall go to salvaged or re-used Dimensional Lumber. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. 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.

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.
6.	Or approved equal	

D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

E. Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties shall not be used. Ties for foundation work shall 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. For exposed finished concrete provide stainless steel screw ties with standard size cones, set back plug.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615 M, Grade 60.

B. Weldable Reinforcing Bars: ASTM A 706/A 706M, Grade 60.

C. Epoxy-Coated Reinforcing Bars: ASTM A 775, to be provided at CONC-02, CONC-03 and CONC-05.

D. Steel Wire and Welded Wire Reinforcement: ASTM A 1064. Galvanized at exterior locations, conditions permanently exposed to weather and/or water, and where noted on drawings (plan and/or sections).

E. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 , plain-steel bars, cut true to length with ends square and free of burrs.

F. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 , plain-steel bars, ASTM A 775/A 775M epoxy coated.

G. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

H. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

I. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire reinforcement 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 repaired prior to placement of concrete.

a. Use recycled plastic rebar supports. Subject to compliance with requirements, provide one of the following:

1) International Plastics Group
2) Eclipse Plastic
3) Meadow Burke
4) Or Approved Equal

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.

J. Rebar Couplers

1. Subject to compliance with requirements, provide rebar couplers from one of the following manufacturers:

a. Lenton
b. Dextra Group
c. Dayton Superior
d. Or Approved Equal

2.3 CONCRETE MATERIALS

A. Portland cement: ASTM C 150, Types I, II, or I/II. 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. Provide Pozzolans in mix per sections below:

1. Pozzolans: 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 this content may offset or entirely satisfy the minimum percentage required.

    a. Silica Fume: ASTM C 1240
    b. 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 shall 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 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. Lightweight Aggregates: Well-graded crushed expanded shale produced by rotary kiln method. Solite or equal, conforming to ASTM C330.

D. 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.

E. Air-Entraining Admixture: ASTM C 260.

1. Liquid air-entrainment: Subject to compliance with requirements, provide one of the following:

a.	“Airmix”	Euclid Chemical
b.	“Darex AEA”	W. R. Grace
c.	“MB-VR”	Master Builders
d.	Or approved equal.	

F. Water-Reducing Admixture: ASTM C 494.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	“MasterPolyheed 997”	Master Builders
b.	“Euclid MR”	Euclid Chemical
c.	“WRDA 64”	W. R. Grace.
d.	Or approved equal.	

G. 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:

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
e.	Or approved equal.	

H. Water Reducing, Non-Corrosive Accelerating Admixture: The admixture shall 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 Commissioner.

1. Products: Subject to compliance with requirements, provide the following:

a.	"Accelguard 80"	Euclid Chemical Co.
b.	"Daraset”	W. R. Grace
c.	“Pozzutec 20”	Master Builders.
d.	Or approved equal.	

I. 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:

a.	"Eucon Retarder 75"	Euclid Chemical Co.
b.	"Pozzolith 100XR"	Master Builders.
c.	"Plastiment"	Sika Chemical Co.
d.	"Daratard"	W.R. Grace.
e.	Or approved equal.	

J. Microsilica Admixture shall be dry densified or slurry formed. Microsilica shall come from the same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source shall be required before acceptance by the Commissioner.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	"Emsac F 100"	Elkem Chemical, Inc.
b.	"Eucon MSA"	Euclid Chemical Co.
c.	"Force 10,000"	W. R. Grace
d.	Or approved equal.	

K. Prohibited Admixtures: Calcium chloride, thyocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

L. 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.

M. Macro-Fibers: Engineered macro-synthetic fibers.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	“Tuf-Strand SF”	Euclid Chemical Co.
b.	“Fibermesh 650”	Propex Concrete Systems
c.	“Forta-Ferro”	Forta
d.	Or approved equal	

N. Micro-Fibers: Engineered micro-synthetic fibers.

1. Products: Subject to compliance with requirements, provide the following:

a.	"Fiberstrand N":	Euclid Chemical Co.
b.	"Fibermesh 150":	Propex Concrete Systems
c.	“Ultra-Net”	Forta
d.	Or approved equal.	

O. Natural Fiber Reinforced Concrete: Natural fiber reinforced concrete is permitted only upon review by Commissioner. Refer to ACI 544.1R, chapter 5

P. Corrosion Inhibitor: 30% calcium nitrite (where called for in the specifications or on the drawings). Subject to compliance with requirements, provide the following at 3 gal/cy:

1.	“Eucon CIA	Euclid Chemical
2.	“DCI”	W. R. Grace
3.	“Rheocrete CNI”	Master Builders.
4.	Or approved equal.	

Q. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

2.4 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufacturers rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

1.	“CETCO Waterstop-RX 101”	CETCO
2.	“MiraSTOP”	Carlisle Coatings and Waterproofing, Inc.
3.	“Conseal CS-231”	Concrete Sealants, Inc.
4.	Or approved equal	

2.5 GROUT

A. Non-Shrink, Non-Metallic Grout: The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	"Euco-NS"	Euclid Chemical Co.
b.	"Five Star Grout"	U.S. Grout Corp.
c.	"Masterflow 713 Plus"	BASF
d.	Or approved equal.	

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. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

C. 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

D. Curing Compounds: The compound shall 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:

a.	“SealTight 1100”	W.R. Meadows

b.	"Kurez W VOX"	Euclid Chemical Co.
c.	"Everclear VOX"	Euclid Chemical Co.
d.	'VOCOMP-25"	W.R. Meadows
e.	Or approved equal.	

E. Sealers/Hardeners: For use on concrete surfaces that will remain exposed (including CONC-05 at the garage slab). 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:

a.	"MasterKure HD 200WB"	BASF
b.	"Euco Diamond Hard"	Euclid
c.	"SLX100"	Prosoco
d.	Or approved equal.	

F. For CONC-05 use a Liquid Sealer/Densifier: The product must be a high performance, deeply penetrating concrete densifier conforming to ASTMC836; odorless, colorless, VOC - compliant, non-yellowing siliconate 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 siliconate

G. Evaporation Retardant:

1. Products Subject to compliance with requirements, provide one of the following:

a.	"Eucobar"	Euclid Chemical Co.
b.	"Confilm"	BASF
c.	"Spray Film"	ChemMasters
d.	Or approved equal.	

H. 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.

I. 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 by Commissioner:

a.	"Eucolastic 1NS"	Euclid Chemical Co.
b.	"Sikadur 51 NS"	Sika
c.	"Pourthane NS"	W.R. Meadows
d.	Or approved equal.	

Maximum allowable depth of these products is ½".

J. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.

1. Products: Subject to compliance with requirements, provide the following:

a.	"Flo-Top 90 or Super Flo-Top"	Euclid Chemical Co.
b.	"Ardex"	Ardex Co.
c.	"Underlayment 110"	Master Builders
d.	Or approved equal.	

K. Bonding Admixture: The compound shall be a latex, non-rewettable type.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	"Flex-Con"	Euclid Chemical Co.
b.	"Daraweld C"	W.R. Grace
c.	"SBR Latex"	Euclid Chemical Co.
d.	Or approved equal.	

L. High Strength Polymer Repair Mortar: For form and pouring or large horizontal repairs, provide the flowable on-part, high strength repair mortar.

1. Products: subject to compliance with requirements, provide the following:

a.	"Eucocrete"	The Euclid Chemical Co.
b.	"Euco Speed MP" (Cold Weather)	The Euclid Chemical Co.
c.	"Emaco R"	Master Builders.
d.	Or approved equal.	

M. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

N. 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.

O. Expansion Joint Filler: ASTM D 1751.

1. Products: Subject to compliance with requirements, provide one of the following:

a.	"Homex 300"	Homasote Company
b.	"Standard Cork Expansion Joint Filler"	A.P.S. Cork
c.	"Fibre Expansion Joint"	W.R. Meadows
d.	Or approved equal.	

P. Water: Potable.

Q. Building Insulation System for exposed cast in place concrete type CONC-03:

1. Rigid Insulation for Concrete Sandwich Panels:

   a. Provide extruded polystyrene rigid board insulation having the physical properties defined by ASTM C 578 for Type IV material with provisions as follows:
   b. Compressive resistance: 25 psi minimum at yield or at 10 percent deformation per ASTM D 1621.
   c. Water Absorption: 0.1 percent maximum by volume per ASTM C 272.
   d. ISR R-Value: 5.0°F•ft2•h/Btu per inch at 75° F minimum per ASTM C 518. R-Value to retain minimum of 90 percent of its published R-value for 15 years.
   e. Manufactured with a blowing agent that provides at least a 90 percent reduction in potential for ozone depletion as compared to standard CFC blowing agents.

      1) Pre-installed, high-strength, polymer twist-lock retainers, designed to position the fiber composite connector within the pre-fabricated insulation sheets. The retainers' are factory set tightly against the surface of the insulation boards in a pre-engineered pattern to transfer lateral and gravity loads from the exterior layer to the structural layer.

   f. Follow the manufacturer's instructions on storing and handling the insulation:

      1) Store insulation system in original system manufacturer's wrapping. Store in a secure dry area, covered with u.v. rated polyethylene or in a location protected from direct sunlight to prevent surface oxidation. Protect insulation from wind damage.
      2) Protect insulation from open flame and heat sources greater than 165 °F.
      3) Avoid contact with petroleum-based solvents.

R. Provide fiber composite connectors at concrete sandwich panels having the following physical properties and attributes:

1. Non-conductive, non-corrosive, fiber-composite connectors having a minimum tensile strength of 120,000 psi, minimum glass fiber content of 76% (by weight), in a thermoset vinyl-ester resin matrix.
2. Upon request, connector supplier shall provide documentation of alkali resistance of connector and long-term shear capacity of connector.
3. Coefficient of thermal expansion: 3.9x10-6 in/in/°F, nominal.
4. Central body of connector shall be provided with a flange to limit insertion depth into insulation.
5. Central body of connector shall have serrated profile to provide interference fit with pre-formed holes in the insulation so as to prevent connector from backing out of insulation after installation.
6. Thermal Conductivity: 6.9 Btu/ (°F•ft2•h) per inch of length.
7. The wythe ties comprise of a fiber-composite connector with a polymer wing that controls the position of the connector within the twist-lock retainer and provides leverage during connector installation The pre-installed twist-lock retainers provide a friction fit with the pre-formed holes in the insulation eliminating concrete flow-through while the buttons structurally support the insulation at the designed location in the forms.
8. Proven accelerated aging testing. Provide reports showing compliance with ASTM C 581
9. Proven fire resistance testing. Provide reports or analysis showing compliance with a minimum fire resistance of 2 hours.

2.7 PROPORTIONING AND DESIGN OF MIXES

A. Preparation of Design Mixes

1. Form TR-3: Technical Report Concrete Design Mix: The contractor shall be responsible for 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.
2. All mix designs shall 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.
3. If previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mix.
4. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1.10f'c+700 psi when concrete strengths greater than 5000 psi are used.
5. The proposed mix designs shall 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 as accepted by the Commissioner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Commissioner before using in work.

E. For exposed concrete elements (as defined by Commissioner), the mix design shall be uniform throughout the project. The mix design shall be approved by the Commissioner for use in any specific location. On site mixing shall be prohibited without approval from the Commissioner.

F. 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).
   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.
3. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Exposure category for exterior concrete is F1. 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 (exposure class F1, moderate exposure); 5.5 percent (exposure class F2 and F3, severe exposure): 1-1/2" maximum aggregate
      2) 4.5 percent (exposure class F1, moderate exposure); 6 percent (exposure class F2 and F3, severe exposure): 1" maximum aggregate
      3) 5 percent (exposure class F1, moderate exposure); 6 percent (exposure class F2 and F3, severe exposure): 3/4" maximum aggregate
      4) 5.5 percent (exposure class F1, moderate exposure); 7 percent (exposure class F2 and F3, severe exposure): 1/2" maximum aggregate
      5) 6 percent (exposure class F1, moderate exposure); 7.5 percent (exposure class F2 and F3, severe exposure): 3/8" maximum aggregate

   b. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.

4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

G. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

1. Concrete for structural topping slab, poured in place slabs and grade beams 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.

3. "Quick Dry" Concrete: 0.40.
4. Subjected to freezing and thawing; W/C 0.45.
5. Subjected to deicers/watertight: W/C 0.45.
6. Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40.

H. 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 shall 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".

I. Chloride Ion Level: Chloride ion content of aggregate shall be tested by the laboratory making the trial mixes. The total chloride ion content of the mix including all constituents shall 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 shall 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 the requirements governing execution.

3.2 GENERAL

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel. Coordinate with installation of horizontal and vertical waterproofing.

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 shall develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31 and C 39 with the maximum slump in accordance with the approved mix design.

B. Concrete shall be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the building code noted above.

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).

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 Subcontractors: Provide openings in concrete formwork to accommodate work of other subcontractors. Determine size and location of openings, recesses and chases from subcontractors 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 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. Install welded wire reinforcement in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.7 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 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 shall be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw shall be used immediately after final finishing and to a depth of 1-1/2". A conventional saw shall 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".

3.8 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.

3.9 PREPARATION OF FORM SURFACES

A. Clean re-used forms of concrete matrix residue, repair 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.

3.10 CONCRETE PLACEMENT

A. Ready-mix concrete shall comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment shall comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.

B. Cold weather mixing procedures shall be submitted to the Commissioner for approval.

C. Notify Commissioner and 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 subcontractors 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. 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.

H. 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.

3.11 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 repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off. Provide this finish at CONC-02 and CONC-03 exterior side.

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, 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. Repair and patch defective areas with fins or other projections completely removed and smoothed. Follow all requirements in ACI 301 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

3.12 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 shall 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 shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Commissioner) shall be 2/3 of the specified tolerances.

E. All elevated slabs shall achieve the specified FL tolerance before the removal of the forms.

F. All slabs on metal deck shall achieve the specified FF.

3.13 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 shall achieve an FF 30 - FL 25 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 30/ FL 25 tolerance. 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.

3.14 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. Use wind breaks and sun shades to avoid plastic or drying shrinkage cracks during warm, dry or windy weather. Evaporation retardant shall be as specified in Section 2.6.
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 repair any holes or tears during curing period using cover material and waterproof tape.

3. Use moisture curing or moisture retaining cover curing at all surfaces to receive waterproofing and / or roofing. This applies to all surfaces to be covered with finish or coating material applied directly to concrete, such as waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials.

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 Dustproofer: 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.

3.15 SHORES AND SUPPORTS

A. Comply with shoring and reshoring in multistory construction 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 shall provide the services of a registered Professional Engineer licensed in the State of New York to design the shoring, and 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.

3.16 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.

3.17 RE-USE OF FORMS

A. Clean and repair 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.

3.18 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other subcontractors, unless otherwise shown or directed, after work of other subcontractors 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. 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.

3.19 CONCRETE SURFACE REPAIRS

A. Prior to all repairs, an as-built condition sketch and method of repair must be submitted to the Commissioner for review and approval.

B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Commissioner. Contractor to propose repair technique to Commissioner for aesthetic approval.

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. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of 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. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

G. Repair 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. Repair 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 repaired areas to blend into adjacent concrete. The specified underlayment compound or repair toping may be used when acceptable to Commissioner.

K. Repair 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. Repair 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 Repair: All structural repairs shall be made with prior approval of the Commissioner as to method and procedure, using the specified polymer repair mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously

specified shall be used. In addition, all cracks shall be filled with the specified crack sealer or other method as approved by the Commissioner. All garage slabs shall be repaired 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 shall achieve the tolerances specified in "Monolithic Slab Finishes" above.

O. Specified Polymer Horizontal Repair Mortar: All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.

P. Repair Methods not specified above may be used, subject to acceptance of Commissioner.

3.20 FOUNDATION WALLS

A. The contractor shall form and leave openings in walls as shown on drawings and approved shop drawings for work of other contractors. These openings shall be temporarily closed and when so directed, the contractor shall point up in solid and neat manner with waterproofed cement.

3.21 WORK IN CONNECTION WITH SUBCONTRACTORS

A. Sleeves, pockets, openings, etc., shall be set in the concrete walls and arches as required by the mechanical subcontractor as shown on approved shop drawings; these shall be encased or built into the concrete work and shall be properly placed and secured in position in the forms before concrete is placed.

B. Provide all chases, pipe slots, etc., required by the mechanical subcontractor (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 subcontractors affected. Panels shall be formed with construction joints as specified. Details for such panels shall be submitted to Commissioner for approval.

D. Coordinate all penetrations, cutting, and patching with waterproofing subcontractor.

3.22 CUTTING AND PATCHING

A. Contractor shall 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 shall meet with the approval of the Commissioner.

B. Where cutting and patching is required, such cutting shall be done at the expense of Contractor but shall be performed by the subcontractor for concrete work.

C. The location and extent of cutting in completed concrete work and the patching thereof shall meet with the approval of the Commissioner.

3.23 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Employ a testing laboratory to perform tests and to submit test reports.

B. City of New York to engage a qualified testing/inspection agency to perform special inspections per the NYC Building Code and the requirements of all applicable ACI standards.

C. At locations previously indicated in this specification and on the contract drawings, verify the use of non-magnetic materials. No magnetic materials are permitted in locations where prohibited by this specification or the contract drawings.

D. 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: 23, SHRP Designation: 2027’ for testing procedure. Frequency of this test shall be the same as that of compressive strength tests, noted above.

8. Floor Preparation to Receive Resilient Flooring: For any concrete that receives resilient flooring, test concrete in accordance with ASTM F 710 prior to acceptance by City of New York.
9. Test results will be reported in writing to Commissioner and Contractor within 24 hours after tests. Reports of compressive strength tests shall 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 shall 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 shall not be used as the sole basis for acceptance or rejection.

10. 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 shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03 30 00

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SECTION 04 01 20 - RESTORATION OF 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. Cleaning down existing face brick walls.

2. Repointing existing face brick walls.

3. Replacing existing damaged face brick.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"

2. Section 07 92 00 "Joint Sealants"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Field-Constructed Mock-Ups: Prior to start of general masonry and stone restoration, prepare the following sample panels on the building where directed by Commissioner. Obtain Commissioner's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.

1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of masonry surface and condition on sample panels of approximately 25 sq. ft. in area.

   a. Test adjacent non-masonry materials for possible reaction with cleaning materials.
   b. Allow waiting period not less than seven (7) calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.

2. Repointing: Prepare two (2) separate sample areas of approximately 3' high by 6' wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.

C. Restoration Program: Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of restoration work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.

B. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

C. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.6 PROJECT CONDITIONS

A. Clean masonry surfaces only when air temperatures are 40 deg. F. and above and will remain so until masonry has dried out, but for not less than seven (7) days after completion of cleaning.

B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg. F. and 80 deg. F. and will remain so for at least forty-eight (48) hours after completion of work.

C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Immediately remove grout and mortar in contact with exposed masonry and other surfaces.

D. Protect sills, ledges and projections from mortar droppings.

1.7 SEQUENCING/SCHEDULING

A. Perform masonry restoration work in the following sequence:

1. Repair existing masonry including replacing existing masonry with new masonry materials.

2. Rake-out existing mortar from joints indicated to be repointed.

3. Repoint existing mortar joints of masonry indicated to be restored.

4. Clean existing masonry surfaces.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Provide face brick conforming to the requirements of Section 04 20 00, Unit Masonry.

B. For mortar materials, conform to the requirements of Section 04 20 00, Unit Masonry.

2.2 CLEANING MATERIALS AND EQUIPMENT

A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

B. Alkaline Prewash Cleaner: Manufacturer's standard alkaline cleaner for prewash applications only which are followed by acidic cleaner of type indicated for afterwash.

1. Product: Subject to compliance with requirements, provide "Sure Klean 766 Prewash," ProSoCo, Inc. or equal by Diedrich Chemicals, Cathedral Stone Products or approved equal.

C. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Diedrich 101 Masonry Restorer", Diedrich Chemicals.
b. "Sure Klean Restoration Cleaner", ProSoCo, Inc.
c. "801 Heavy Duty Masonry Cleaner", American Building Restoration Products.
d. or approved equal.

D. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements provide one of the following:

a. "Diedrich Acid Guard", Diedrich Chemicals.
b. "Sure Klean Acid Stop", ProSoCo, Inc.
c. "Rubber Mask", American Building Restoration Products
d. or approved equal.

E. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, at rates required by the manufacturer, measured at spray tip, and for volume.

1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.

2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.

2.3 MORTAR MIXES

A. Measuring and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1-to-2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within thirty (30) minutes of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by use of selected coloring agent.

C. Do not use admixtures of any kind in mortar, other than colorant.

D. Mortar Proportions

1. Pointing Mortar for Brick: One part white Portland cement, 2 parts lime and 6 parts colored mortar aggregate. Add colored mortar pigment to product mortar colors required to match.

2. Rebuilding Mortar: Comply with ASTM C 270, Proportion Specification, Type N, with cementitious material content limited to Portland cement-lime and coloring agent.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PROTECTION

A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.

B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.

1. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.

2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

3. Dispose of run-off from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.

C. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

3.3 CLEANING EXISTING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

B. Use only those cleaning methods indicated for each masonry material and location.

C. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.

D. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.

E. Water Application Methods: Prior to chemical cleaning, apply water application to mock-ups by spray at various pressures to determine if masonry surfaces can be cleaned adequately and to the Commissioner's satisfaction in this manner. If water applications prove ineffective, proceed with chemical cleaners.

F. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

1. For hard to remove dirt or grime, apply pre-wash cleaner prior to application of chemical cleaner; follow manufacturer's instructions.

3.4 BRICK REMOVAL AND REBUILDING

A. Brick Removal

1. Carefully remove by hand any brick which are damaged, spalled or deteriorated. Cut out full units from joint to joint and in manner to permit replacement with full size units.

2. Support and protect masonry indicated to remain which surrounds removal area.

3. Salvage as many whole, undamaged bricks as possible.

4. Remove mortar, loose particles and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.

5. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

B. Brick Rebuilding

1. Install new or salvaged brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required use motor driven saw designed to cut masonry with clean, sharp unchipped edges.

2. Lay replacement brick with completely filled bed, head and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which

ensure that units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.

3. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

3.5 REPOINTING EXISTING MASONRY

A. Joint Raking

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound, unweathered mortar.

2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.

   a. Cut out old mortar by hand with chisel and mallet.
   b. Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Commissioner based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.

2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.

3. After joints have been filled to a uniform depth, place remaining pointing mortar in three (3) layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in a damp condition for not less than seventy-two (72) hours.

6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than thirty (30) days before beginning cleaning work.

END OF SECTION 04 01 20

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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 restoration.
2. Face brick to match existing.
3. Metal joint reinforcing, anchors, ties, weeps, closures and related accessories for masonry.
4. Control joints in masonry, filled with joint fillers.
5. Thru-wall flashing.
6. Mortar net.
7. Chases, recesses, pockets and openings in masonry as required for installation of work by other trades.
8. Building in of items furnished by other trades into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
9. Grouting in of metal items built into masonry work.
10. Protection, pointing and cleaning of masonry.
11. Brick sealer.

B. Related Sections

1. Section 07 62 00 "Sheet Metal Flashing and Trim"
2. Section 07 84 13 "Penetration Firestopping"
3. Section 07 92 00 "Joint Sealants"

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Shop Drawings: Submit for:

1. Anchoring details.

2. Control and expansion joint locations and details.

3. Special brick shapes, including large scale shop drawings showing configuration and dimensions.

4. Flashing at typical lintels indicating relationship of flashing to lintel hangers.

C. Samples (Submit the following):

1. Each type of face brick. Submit certification that brick meets ASTM standards specified herein.

a. Submit samples of all special shapes required showing color range and sizes.

2. Joint reinforcing, each type, width and proposed location (labeled).

3. Anchors, each type, width and proposed location (labeled).

4. Joint filler, each type.

5. Flashing, including splice sample, 12" long.

6. Mortar color, 12" long cured sample.

D. Manufacturer's Literature: Submit technical and installation information for:

1. Mortar materials, each material and mortar type.

2. Certification of mortar mix.

3. Flashing material, descriptive literature.

4. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.

5. Submit block manufacturer’s certifications of compliance with ASTM C 90, ASTM 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. Construction 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. Conform to the following non-cumulative tolerances (Rebuild any masonry work not meeting these standards as directed by the Commissioner).

1. Variation from the plumb:

a. In lines and surfaces of columns, walls and arrises:

1).	In 10 feet	1/8"
2).	In any story of 25 feet maximum	1/4"

3). In 40 feet or more 1/4"

b. For external corners, expansion joints and other conspicuous lines:

1). In any story of 25 feet maximum 1/4"

2). In 40 feet or more 3/8"

2. Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

a. In any bay or 20 feet maximum 1/4"

b. In 40 feet or more 1/4"

3. Variation of the linear building lines from established position in plan related portion of columns and partitions:

a. In any bay or 20 feet maximum 1/4"

b. In 40 feet or more 1/2"

4. Variation in cross-sectional dimensions of columns and in thickness of walls:

a. Minus 1/8"

b. Plus 1/8"

5. Variation in dimensions of masonry openings:

a. Horizontal dimension -0" + 1/16"

b. Vertical dimension +0" - 1/16"

C. 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 DELIVERY, STORAGE AND HANDLING

A. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.

B. Aggregate: Store with provisions for good drainage.

C. 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 TESTING FOR EFFLORESCENCE

A. Test selected face brick for efflorescence in accordance with ASTM C 67.

B. If, at the end of the test period, the samples of brick or mortar show efflorescence, the materials represented will be rejected and new materials must be re-tested. This process must be repeated until no efflorescence

appears. Testing must be done by an independent testing laboratory retained by the Contractor; submit test results in writing to the Commissioner.

1.7 JOB CONDITIONS

A. In cold weather, when the outside temperature is below forty (40) degrees F., conform to the requirements of "Cold Weather Masonry Construction and Protection Recommendations" publication by Brick Industry Association (BIA). No anti-freeze admixtures are permitted.

1. In addition, conform to the following:

a. Masonry materials must be warmed as required.
b. Brickwork must be protected a minimum of 24 hours after installation so as to maintain enough heat for hydration of the cement in the mortar.

B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. F. and above. In addition, conform to the following:

1. Masonry materials must be cool.

2. Mortar must be used within 2 hours of initial mixing.

C. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24" down both sides and hold cover securely in place.

2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24" down face next to unconstructed wythe and hold cover in place.

D. 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.

1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed 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 equal to "Solite," "Norlite," "Haydite" or approved equal.

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: 75% solid units.

4. 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 block surfaces, in addition to ASTM requirements, provide block with 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: Steam cure all concrete block and air dry for not less than thirty (30) days before delivery.

8. Density of concrete block: Maximum one hundred and five (105) lbs. per cubic foot.

9. Shrinkage of concrete block: Maximum 0.065% when tested in accordance with ASTM C 426-99.

10. Water Content

    a. At the time of delivery to the job site, provide concrete masonry units with 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. Brick

1. Size: To match existing.

2. Facing Brick: ASTM C 216, Grade SW, Type FBX, to match existing.

3. Where new brick is used in lieu of salvaged brick, provide brick matching original brick in size, shape, color, texture, strength and porosity.

   a. Color, size and mortar: Match existing adjacent brick.
   b. Common bond pattern: Match existing adjacent brick.

4. Where brick is fully concealed provide common brick conforming to ASTM C 62, Grade SW.

5. Provide all special molded shapes as indicated on the drawings.

6. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored units with all exposed surfaces finished.

C. Joint Reinforcing for Masonry Walls: 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. Reinforcing must be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.

1. Wire used in assemblies noted above: Cold drawn steel wire conforming to ASTM A 82.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hohmann & Barnard
b. Heckmann Building Products
c. Wire-Bond
d. Or approved equal

D. 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 by Hohmann & Barnard, Heckmann Building Products, Wire-Bond or approved equal.

a. Galvanizing: Conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.

3. For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel partition top anchors equal to No. 419 and No. 421 made by Heckmann Building Products, No. PTA 420 made by Hohmann & Barnard, PTA #4301 by Wire-Bond 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.

5. For anchoring to existing brick: Adjustable veneer anchor HB 5213 by Hohmann & Barnard or approved equal by manufacturer noted above in Para. C.2.

E. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.

F. Control and Expansion Joint Fillers

1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, that 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 Joint 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 Joint Sealants.

3. Within Face Brick: Provide filler rod and sealant installed by Section 07 92 00 Joint Sealants.

a. Filler depth: 2 times joint width.
b. Compressible filler between top of brick and bottom of shelf angle or steel lintel: “Soft Joint Sealant” made by Polytite, or equal by BASF Construction Chemicals - Building Systems, Construction Foam Products, a division of Nomaco, Inc. or approved equal.

4. Within Expansion Joint at Face Brick: Manufacturer’s standard preformed, pre-compressed, open-cell polyurethane foam sealant impregnated with a water based, non-drying polymer modified acrylic water repellent. Provide “Seismic Colorseal” installed to twenty-five 25 percent compression, as manufactured by Emseal, or equal by Schul International Co., Inc., Watson Bowman Acme Corp. or approved equal.

a. Properties: Permanently elastic, mildew resistant, non-migratory, non-staining, and compatible with joint substrates and other joint sealants. Density: 8.4 to 9.1 lb./cu. ft..

G. Neoprene Joint Filler: Provide closed cell neoprene, Type NN-1, conforming to ASTM D 1056, Grade 1, high performance, as manufactured by Williams Products Inc., or equal made by D. S. Brown, Norton, 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. Aggregate for Grout: ASTM C 404.

E. Water: Clean, fresh and suitable for drinking.

2.3 MORTAR MIX

A. Exterior Face Brick Construction: Mortar mixes meeting ASTM C 270, Type N, cement/lime mortar. For colors of mortars use coloring agent made by Davis Colors, Lehigh Cement or approved equal. The Contractor may use pre-packaged colored mortar equal to "Color Mortar Blend" by Glen-Gery, or equal by Davis Colors, Lehigh Cement or approved equal.

1. Color of mortar: Match existing and must meet with Commissioner's approved sample and mock-up panel.

2. Mortar and joints: Match original in size, tooling, color, texture, strength and porosity.

B. 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.

C. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.

D. 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.

E. 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.

F. 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.

2.4 WEEP HOLES

A. Honeycomb Vents for Cavity Weeps: Grey polypropylene, complying with ASTM D 2240, size 1/4" or 3/8" by height and width of brick; #QV – Quadro Vent as manufactured by Hohmann & Barnard, Inc., or equal by Advanced Building Products, Heckmann Building Products, Wire-Bond or approved equal.

2.5 THRU-WALL FLASHING

A. Provide 40 mil EPDM sheet membrane flashing. Provide sealants and tapes as recommended by the manufacturer. Provide preformed corner sections "end dams" with system when flashing is discontinuous.

1. Provide flashing for surface adhered applications at sheathed areas with 26 ga. stainless steel termination bar.

2. Provide wall flashing with 26 ga. stainless steel drip edge adhered to edge of flashing. Set drip edge in sealant as specified in Section 07 92 00 Joint Sealants.

2.6 MORTAR NET

A. Provide 10" high HDPE "Mortar Net" open mesh mortar net of width to fit masonry cavity shown on drawings, manufactured by Hohmann & Barnard, "Mortar Break II," made by Advanced Building Products or comparable by Heckmann Building Products, Wire-Bond, CavClear or approved equal.

2.7 BRICK SEALER

A. Matte, clear, non-yellowing, water-based silane/siloxane water repellent sealer.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Prosoco; Sure Klean Weather Seal Siloxane PD or comparable product by one of the following:

1. W.R. Meadows

2. Sherwin-Williams

3. or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PREPARATION

A. Brick

1. Wet brick having an initial rate of absorption greater than 30 grams per 30 square inches when tested per ASTM C67. Wet bricks by allowing water to run on the cubes or pallets of brick, or placing them in a large tank of water.

2. Except for absorbent units specified to be wetted, lay masonry units dry.

B. Concrete Block: Do not wet concrete block units.

3.3 INSTALLATION

A. General

1. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.

2. Build chases and recesses as shown or required for the work of other trades.

3. 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.

4. 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.

5. Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.

6. 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.

7. 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, all such surfaces, including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, must be made suitable for paint application. Only cut openings in walls and partitions in place with the approval of the Commissioner.

8. Do not use any brick that do not meet chippage and tolerances of the applicable ASTM standard noted herein for the grade, type or class of brick.

9. Mortar, ties and reinforcement must not extend into or bridge any expansion joints.

B. Mortar Bedding and Jointing

1. Completely fill all joints between bricks with mortar. Bevel bed joints per BMI recommendations, with the brick then shoved in place. At cavity wall construction, take care that no excess mortar goes into masonry cavity. Completely fill head joints with mortar and form by applying a full coat of mortar to the entire end or the entire side, as the case requires, and then shove the mortar covered end and/or side of the brick tightly against the bricks previously laid; the practice of “slushing” by throwing mortar into the head joints will not be permitted. Lay all brick without disturbing the brick previously laid. Lay brick within a minute or so after the mortar is placed. Dry or butt joints will not be permitted. Grout only as necessary. Do not slush head joints.

2. After brick placement, cut off mortar squeezed out of bed joints before tooling.

3. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells.

4. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.

5. Provide exposed joints that are flush with the surface of concrete masonry units. Strike flush concealed joints.

6. 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 located within masonry construction. Fill in solidly with masonry around built-in items.

2. Mortar 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 Joint 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. For masonry indicated as being reinforced, fill all voids solid with grout. 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, stop the grout pour 1-1/2" below the top of a masonry unit. Accurately place vertical bar reinforcing and hold in position while being grouted, and retain in place before grouting starts. Provide all such reinforcing with 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 192 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. All exposed masonry which requires cutting or fitting must be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.

2. Do not saw cut any masonry openings in face brick construction without Commissioner's approval and after a procedure has been reviewed and approved.

3. Holes made in exposed masonry units for attachment of handrail brackets and similar items must be neatly drilled to proper size.

4. 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. 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. Ties and Anchors for Masonry Construction: Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not to exceed sixteen (16) inches o.c. horizontally and/or vertically. Provide additional ties within 1'-0" of all openings and adjacent to expansion joints and spaced not more than 16" apart around perimeter of openings.

H. 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.

I. Control and Expansion Joints

1. Provide expansion, 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 them on approved shop drawings.

J. 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'-0" to 8'-0"	6"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	8"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	12"	3 - #3 3- #4

3.4 FLASHING/WEEP HOLES

A. General: Install embedded flashing and weep holes in masonry at relieving angles, shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated. Space weeps 16" o.c. unless otherwise shown on drawings. Install weeps immediately above the flashing.

B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing.

C. Generally, place flashing at bottoms of cavity wall construction, over all wall openings, window jambs, at sills of window, and in other locations where indicated on the drawings. Overlap flashing a minimum of 6". At bottoms of cavity walls, build the flashing extending from the exterior face of the brick, up and into the mortar joint 2" at the inner wythe of the CMU back-up. At concrete spandrel beams and columns, install the flashing with a termination bar. Exercise extreme care in placing the masonry materials so as not to damage the flashing. Restore flashing damaged during the masonry erection. Terminate discontinuous flashing with an end dam in a head joint, rising at least 1".

D. When spanning an air space, support flashing with a mortar wash, insulation or treated wood blocking.

E. Where flashing is penetrated by anchors, patch flashings at penetration using adhesive and mastic recommended by the manufacturer to ensure watertight seal.

F. Install flashing in accordance with manufacturer's instructions, using adhesive, primer, thinner, cleaner and mastic as recommended by flashing manufacturer.

1. Flashing must overlap adjacent piece of flashing a minimum of 6".

G. Provide drip edge when flashing extends beyond face of brick.

3.5 CLEANING, PROTECTION, ADJUSTMENT

A. Protection: 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.

1. Wipe excess mortar off the masonry surfaces as the work progresses.

2. Place wood coverings over all such masonry surfaces as are likely to be damaged during the progress of the entire project.

3. Perform protective measures in a manner satisfactory to the Commissioner.

4. Restore damaged masonry units to satisfaction of the Commissioner.

5. Drape exterior masonry walls with waterproof covering until copings are in place to prevent water penetration in cavity.

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.

3.6 BRICK SEALING

A. Apply sealer according to manufacturer's written instructions.

END OF SECTION 04 20 00

SECTION 05 12 00 -STRUCTURAL STEEL FRAMING

PART I - 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 but is not limited to the following as shown on the drawings and as specified herein:

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 struts, columns, bearing plates, beams, steel trusses, 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 Sections:

1. Section 03 30 00 “Cast in Place Concrete”
2. Section 04 20 00 “Unit Masonry”
3. Section 05 31 00 “Steel Decking”
4. Section 05 50 00 “Miscellaneous Metals”
5. Section 06 10 00 “Rough Carpentry”
6. Section 07 13 26 “Sheet Membrane Waterproofing”
7. Section 07 92 00 “Joint Sealers”

C. Related Requirements:

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. Light gage metal roof trusses.
6. Stair framing and hangers.

7. Field painting of structural steel, except as specified herein.
8. Fireproofing systems.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Product Data: Submit data for each type of product indicated in the contract documents.

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 approved.
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 shall include any moment and shear connections. Appropriate marks for designating all types and sizes of joint details shall be included. After approval of these job standards, the erection plans are to be submitted and shall 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 such as moment and brace frames. Calculations shall 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 in the state of New York. 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, including 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. 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.
17. 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.
18. 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.
19. 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 shall 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 shall clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
3. Submit anchor bolt checking certification as required.
4. Submit qualification certificates of all welders who will perform work on the project.
5. 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.

1.4 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.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches.
2. Welded built-up members with plates thicker than 2 inches
3. Column base plates thicker than 2 inches

D. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.5 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.

1.6 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, 2014 Edition
2. AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
3. AISC "Code of Standard Practice for Steel Buildings and Bridges" latest edition.
4. AISC “Seismic Provisions for Structural Steel Buildings”, latest edition.
5. Industrial Fasteners Institute "Handbook of Bolt and Bolted Joints" latest edition.
6. RCSC "Specifications for Structural Joints Using High-Strength Bolts."

7. ASTM Standards as applicable in the New York City Building Code and as noted in this specification.
8. AWS D1.1, "Structural Welding Code."
9. AWS A5.18 & A5.28, Structural Welding Code for GMAW
10. SSPC "Painting Manual, Volume 2, Systems and Specifications.", Latest edition. Use design method indicated on structural drawings.

C. Lateral Framing Resisting System: Type used is indicated on structural drawings.

1. Qualify welding procedures and welding operators in accordance with the AWS "Standard Qualification Procedure."
2. Submit certification that all welders to be employed in work are AWS qualified. If re-certification of welders is required, retesting will be responsibility of structural steel subcontractor.

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 at no expense to the Contractor. The inspection agency shall work under the direction of the City of New York. Contractor shall 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 shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the person making the connection.

C. The following minimum criteria shall be adhered to in testing of welds and bolts:

1. All welds and bolts shall be examined by visual means.
2. 25% of all welds, selected randomly, shall be measured.
3. Bolted joints shall be verified per the RCSC “Specification for Structural Joints Using High-Strength Bolts,” Section 9, based on installation method.
4. All welds subject to tensile stress shall be examined by the Ultrasonic Method for 100% of their length.
5. 10% of all manual fillet welds shall be tested by the magnetic particle method.
6. 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method.
7. 100% of groove welds shall 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 shall be visually inspected and spot tested using Ultrasonic Method ASTM E 114 and AWS, Chapter 6, Part C. All inspected welds shall 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 shall be prepared to utilize the following approved methods of testing:

    a. Liquid penetrant inspection: ASTM E 165.
    b. Magnetic particle: ASTM E 1444.
    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, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the Commissioner.

H. Apparatus and procedures for measuring required tension in pretensioned and slip-critical high strength bolted connections shall be furnished and maintained by the steel contractor, in accordance with the RCSC “Specification for Structural Joints Using High-Strength Bolts,” and shall be approved by the inspection agency. The inspection agency shall observe the pre-installation verification testing required and shall ensure by routine observation that the bolted installations conform to the approved pretensioning method being used. The steel contractor shall provide a laborer and scaffolding as required for the testing of connections by the inspection agency, and shall, 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. Repair defective or damaged areas in accordance with painting requirements specified. Architecturally exposed structural steel shall be free of runs and holidays. Make repairs 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. Repair or replace damaged materials or structures as directed.

1.9 PROJECT CONDITIONS

A. Coordinate the structural steel work with the work of other trades. Verify all dimensions and details of this trade and those of other trades that affect the work before proceeding. Any discrepancies shall 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 shall 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 shall be set by another subcontractor. 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 shall be the responsibility of the structural steel contractor and corrective measures shall be borne by the contractor.

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 coordination with other related trades and professions.

1.10 SUBSTITUTION

A. The 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.

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: As noted on Structural Drawings.

C. Anchor Rods: 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. Coordinate all paint requirements with specification section 099000.
2. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
3. Demonstrate a minimum opacity as determined by ASTM D 2805
4. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
5. “Slip Critical” compatible rating where applicable
6. The product shall 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.
7. The product shall 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 shall be given to products with the least crystalline silica content.
8. The product shall 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. Coordinate all paint requirements with specification section 099000.
2. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
3. Demonstrate a minimum opacity as determined by ASTM D 2805
4. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
5. "Slip Critical" compatible rating where applicable.
6. The product shall 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.
7. The product shall 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 shall be given to products with the least crystalline silica content.
8. The product shall 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 the execution requirements.

3.2 FABRICATION

A. All shop connections shall 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 shall 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 shall 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 shall be shown on the shop drawings. No change in size or location will be permitted without prior approval.

G. Manual flame cutting shall 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 shall 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. Field welding is not allowed without written instruction from the Commissioner.

C. Proportion and detail all connections on shop drawings to resist forces shown on drawings.

D. Bolting

1. Bolts shall be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the thread.
2. Joint Type: As noted on the Structural Drawings.
3. Make high-strength bolted joints without the use of erection bolts. Bolt heads and nuts shall rest squarely against the metal. Where structural members have sloping surface, bolted connections shall be provided with beveled washers to afford square seating or framing for bolt heads or nuts.
4. All joints are to be compacted to the snug-tight condition in accordance with Section 8 of the RCSC “Specification for Structural Joints Using High-Strength Bolts.” Protect bolt heads and threads from damage during installation.
5. Pretensioned and slip-crtical joints are to be installed by one of the methods prescribed in Section 8.2 of the RCSC “Specification for Structural Joints Using High-Strength Bolts,” unless written approval is obtained from the Commissioner.
6. Bolts that have been completely tightened shall be marked for identification.

E. Welding

1. The following environmentally preferable welding processes shall 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) shall be used where SAW is not applicable (such as for angled connections and anything irregular or short).
    c. Field welding shall be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) shall 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 shall be in accordance with Table 4.2 (including footnotes) of the AWS Code for Welding in Building Construction. The temperature shall be measured from the side opposite to that which the pre-heat is applied, where possible.
4. All groove welds shall be continuous and full penetration welds unless otherwise shown on the design drawings. Welds made without the aid of a back-up bar shall 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 shall be sound throughout. There shall 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 shall be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used shall 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 shall 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. Faying surfaces in bolted connections shall be prepared per Section 3.2 of the RCSC “Specification for Structural Joints Using High-Strength 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 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

3.6 SOURCE QUALITY CONTROL

A. Refer to testing and inspection requirements specified above.

3.7 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 the Commissioner of any errors. Obtain the 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.

3.8 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.

3.9 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 shall 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 shall be packed solidly with grout specified in another Section. Wedges and shims shall be set back a minimum of 3/4" from the edges of plates and shall be left in place. Leveling plates are not permitted.

D. Plumbing, Leveling and Bracing

1. Structural steel shall be erected true and level, and temporary bracing shall be introduced wherever necessary to provide for all loads to which the structure may be subjected, including equipment and the operation thereof. Such bracing shall be left in place as long as may be required for safety. No welding shall 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 shall 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.

3.10 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 High-Strength 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 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.

3.11 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

3.12 WASTE MANAGEMENT

A. Separate and recycle waste materials in accordance with the 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 New York City 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 but is not limited to the following as shown on the drawings and as specified herein:

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 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 shall 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.

1.4 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 shall 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 shall not exceed (1/360) of the span or (1/4) inch whichever is less.

D. Deck shall 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.

1.5 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, Latest Edition
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".

C. Fabricator Qualifications: The work under this section shall be performed by a fabricator and erector submitting conclusive evidence of having satisfactorily completed work of similar scope and of having the necessary skill, equipment, facilities and capacities to fabricate and perform the erection in accordance with the construction schedules and in full compliance with all requirements of the Contract Documents.

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 wastage 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. Repair or replace damaged materials or structures as directed.

1.7 PROJECT CONDITIONS

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 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 contractor shall 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 theand/or The City of New York’s agent.

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 shall be manufactured by one of the following (or other equivalent as approved by the Commissioner):

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 shall 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 shall 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 shall be those types, sizes, and configurations recommended by the decking manufacturer, and shall be of the same material and finish as the deck units. All accessories shall conform to ASTM A653/A63M.

D. Cell closure flexible strips, and fillers shall be of material in compliance with applicable building code governing class of construction.

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 shall 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 shall 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 shall 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 INSPECTION

A. Inspection of the metal deck and shear stud installation will be performed by an inspection agency retained by the City of New York at no expense to the contractor. The inspection agency shall work under the

direction of the City of New York. Contractor shall 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.

3.4 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 shall 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, continuity 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 shall be installed by welding through metal deck onto beam below. Automatic welding machinery of approved design, amperage, duration of current, etc., shall be used. Studs shall be tested by testing laboratory in accordance with AWS Procedures for Bend Test; replace all studs which do not pass test.

H. All welding shall be performed by competent experienced welding mechanics. All welds shall 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 shall be touched up with a protective coat of paint by this contractor as erected.

3.5 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 shall 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.

3.6 FIELD QUALITY CONTROL

A. Special Inspection as required by the applicable Building Code of all metal decking will be performed by an inspection agency retained by the City of New York at no expense to the Contractor. The inspection agency shall work under the direction of the City of New York. Contractor shall 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 shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the person making the connection.

C. The following minimum criteria shall be adhered to in testing of welds:

1. All welds shall be examined by visual means.
2. 25% of all welds, selected randomly, shall be measured.
3. In addition, all welds subject to tensile stress shall be examined by the Ultrasonic Method for 100% of their length.
4. 10% of all manual fillet welds shall be tested by the magnetic particle method.
5. 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method.
6. 100% of groove welds shall 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 shall 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, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the Commissioner.

G. 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.

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.

3.7 CLEANING UP

A. Remove all equipment, unused materials and debris from the site immediately upon the completion of this work.

3.8 WASTE MANAGEMENT

A. Separate and recycle waste materials in accordance with the 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 NYC 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

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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 07 42 13.
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 07 42 13 "Metal Wall Panels"
6. Section 09 21 16 "Gypsum Board Assemblies" 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-Coted (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 New York City Building Code) with a maximum deflection of L/360 with metal panels and L/720 for masonry.

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 Scafco, 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 Scafco, 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 Scafco, 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 requirements governing execution.

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 2014 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

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. Vertical steel ladders.
3. Steel pipe handrails and railings not part of steel pan stair assemblies.
4. Light steel framing and supports, not included as part of work of other trades.
5. Structural steel door frames at service doors.
6. Steel bollards.
7. Miscellaneous steel trim.
8. Steel grating and frames.
9. Countertop supports.
10. Sleeves in concrete walls and slabs.
11. 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.
12. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
13. 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 06 10 00 "Rough Carpentry"
3. Section 09 90 00 "Painting and Coating"

1.3 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. AISC "Manual of Steel Construction"

2. AWS D1.1 "Structural Welding Code"

3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning"

4. SSPC PA-1 "Painting Application Specification"

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. Engage the services of a galvanizer who has demonstrated a minimum of three (3) years' experience in the successful performance of the processes. The Commissioner has the right to inspect and approve or reject the galvanizer/galvanizing facility.

F. 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 shall 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.

G. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

1.4 PERFORMANCE STANDARDS

A. Railings shall be designed to resist loads per New York City Building Code.

1.5 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 ladders or railings are fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here shall 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 shall be signed and sealed by this Engineer.

E. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown 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 shall be signed by the galvanizer and shall 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.

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 Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.

4. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.

5. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.

6. 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.

7. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

8. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.

9. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

10. 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. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using the following unless otherwise noted:

1. Product: Subject to compliance with requirements, provide one of the following:

a. Tnemec; Series 88 Azeron Primer
b. ICI Devoe; Rust Guard quick dry alkyd shop coat No. 41403
c. International Protection Coatings; Interlac 393
d. Or approved equal.

2. If steel is to receive high performance coating as noted in Section 09 90 00, Painting and Coating, shop prime using primer noted in 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: All ferrous metal (except galvanized steel) shall be cleaned and shop painted 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 shall 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 shall 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 shall be only as stated in said instructions.

3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall 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, shall 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 shall 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 shall 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 shall 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 (e.g. flux inclusions), material to be galvanized shall be dipped 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 shall 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 shall 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 shall 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 shall 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 shall be accurately and neatly fabricated, assembled and erected.

B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall 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 shall 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. Shall be in accordance with AWS D1.1 and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
   b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall 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 shall 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 shall 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 shall 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 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 shall 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 shall 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, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.

K. Preparation for Hot-Dip Galvanizing: Fabricator shall 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 shall 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 10 00, Rough 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. Ladders

1. Vertical steel ladders shall be eighteen (18) inches wide with 3/4" diameter non-slip steel rungs spaced twelve (12) inches o.c. Stringers shall be 3/8" thick by 2-1/2" wide steel bars; rungs welded to bars. Attach ladders to walls six (6) inches from top and bottom and maximum thirty-six (36) inches o.c. from these points. At the roof, gooseneck the rails back to the structure to provide secure ladder access.

2. Ladders shall 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.

C. Steel Pipe Handrails

1. Provide Schedule 40 steel pipe of size shown on Drawings. Fittings shall be flush type, malleable of cast iron. Brackets shall be malleable iron, design as selected by the Commissioner.

2. Construction: Form direction changes in rails using solid bar stock or elbows. Connections shall be shop welded and ground smooth and flush, except where field connections and expansion joints are required. Field connections may be welded, internal sleeve and plug weld, or internal sleeve and set screw.

3. Secure handrails to walls with wall brackets. Provide brackets of malleable iron castings, with not more than three (3) inches clearance from inside face of handrail to wall surface. Neatly drill wall plate portion of the bracket into concrete or masonry to receive bolts for concealed anchorage. For installation at drywall, Drywall trades shall provide plate to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown.

4. Provide wall return fittings of cast iron, flush type, with the same projection as that specified for wall brackets.

5. Longitudinal members shall be parallel with each other and with floor surface or shape of stair to a tolerance of 1/8" in 10'-0" linear feet. Center line of members within each run of railing shall be in the plane.

6. For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2" greater than outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than one (1) inch greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to post. Posts shall be set plumb within 1/8" vertical tolerance.

7. Steel pipe handrails shall be capable of resisting a two hundred (200) lb. force applied to rail from any direction and a uniformly distributed load of fifty (50) lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.

D. Miscellaneous Light Steel Framing

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall 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 shall 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.

E. 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. McNichols
   b. Reliance
   c. Borden
   d. Irving Subway Grating
   e. 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 shall be provided with two (2) five knuckle, fast pin, regular weight, plain bearing, wrought bronze butt hinges. Each hinged section over 4'-0" wide shall be provided with three (3) butt hinges. Hinged sections shall 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.
   d. Sidewalks and Vehicular Driveways: Capable of withstanding a uniform load of 250 lfb/sq. ft. or a concentrated load of 8000 lbf, whichever produces the greater stress.

F. 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.

G. Steel Bollards: Provide six (6) inches O.D. extra strong (Schedule 80) steel pipe, concrete filled, with base of steel plate for mounting to anchor bolts in concrete foundation. Rabbet top of steel pipe and insert 1/4" steel plate cap, flush with top of pipe. Weld top of cap to pipe and grind smooth and flush.

H. 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.

I. 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.

J. Masonry Support Steel: Provide galvanized steel, relieving angles, plates, accessories and other steel shapes for masonry support steel.

1. Fabricate masonry support steel to allow final adjustment with the closest tolerances possible. Relieving angles which require cutting to fit masonry flashing shall 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.

K. Sleeves in Concrete Walls and Slabs

1. Sleeves through concrete walls shall be 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 shall 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 shall be 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 requirements governing execution.

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 51 13 - METAL PAN STAIRS

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 pan stairs, including all clips, hangers, inserts, braces and other supports.

2. Steel pipe hand rails, guard rails and intermediate rails for steel stairs, including supports, brackets, and anchors.

B. Related Sections

1. Section 03 30 00 "Cast-in-Place Concrete"

2. Section 05 12 00 "Structural Steel Framing"

3. Section 05 50 00 "Metal Fabrications"

4. Section 09 21 16 "Gypsum Board Assemblies"

5. Section 09 90 00 "Painting and Coating"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Assurance".

B. Qualification of Welders: Use only certified welders and the shielded arc process for all welding performed in connection with the work of this Section. Protect adjacent surfaces when field welding to prevent damage or stain. Welders and welding operators must be qualified by tests as provided by AWS.

C. Codes and Standards: In addition to complying with DDC General Conditions, comply with:

1. "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.

2. "Code for Welding in Building Construction" of the American Welding Society.

3. "Metal Stairs Manual" of the National Association of Architectural Metal Manufacturers.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Shop Drawings

1. Before any steel stairs are fabricated, submit shop drawings to the Commissioner for approval.

2. Show all locations, markings, quantities, materials, sizes and shapes, and indicate all methods of connecting, anchoring, fastening, bracing, for the stair construction, support and attachment to the work of other trades.

C. Engineering Data

1. Before any metal pan stairs are fabricated, submit engineering data drawings for review. The Contractor is responsible for the structural design and supports for the stair system and must show proposed system 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 stair members.

3. Contractor to engage a Structural Engineer licensed in the State of New York to prepare calculations and drawings. Submit calculations and drawings signed and sealed by this Engineer.

1.5 SAMPLES SUBMISSION

A. Submit the following listed samples and other samples as may be requested by the Commissioner, to show the quality standards:

1. Railing bracket.

2. Exposed weld.

3. Exposed bolted connection.

4. Bent pipe railing.

B. Submit samples cleaned and shop primed.

1.6 PERFORMANCE STANDARDS

A. Construct stairs and railings to conform to the following performance standards, unless greater required by New York City Building Code:

1. Stairs and platforms must support a live load of one hundred (100) psf and a concentrated live load of three hundred (300) lbs. and must have a live load deflection limited to 1/360 of the span. Loads do not apply simultaneously.

2. Railings must withstand a two hundred (200) lb. force applied to rail from any direction, and a uniformly distributed load of 50 lbs./lin. ft. applied downward or horizontally, loads not to act simultaneously.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel: ASTM A 36.

B. Steel Sheets: ASTM A 245, Grade C, minimum ten (10) gauge for platforms, twelve (12) gauge minimum for treads and risers.

C. Steel Pipe: ASTM A 53, Type E., Grade A, and ASTM A 501. Use standard malleable iron fittings for steel pipe.

D. Malleable Iron Castings: ASTM A 47, Grade 35018.

E. Bolts and Nuts: ASTM A 307, Grade A bolts.

F. Machine Screws: ASME B 18.6.3.

G. Expansion Bolts: "Cinch" type, galvanized, of approved manufacture.

H. Threaded End Hanger Rods: Minimum 3/4" diameter, ASTM A 36.

I. Shop Paint: Shop prime all stairs and railings using the following:

1. Product: Subject to compliance with requirements, provide one of the following:

a. Tnemec; Series 88 Azeron Primer
b. ICI Devoe; Rust Guard quick dry alkyd shop coat No. 41403
c. International Protection Coatings; Interlac 393
d. Or approved equal.

J. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D1187.

K. Concrete Fill and Reinforcing Materials

1. Concrete Materials and Properties: Comply with requirements in Section 03 30 00, Cast-in-Place Concrete, for normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 3000 psi.

2. Nonslip-Aggregate Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rustproof and nonglazing; unaffected by freezing, moisture, or cleaning materials.

3. Welded Wire Fabric: ASTM A 185, 6 by 6 inches – W1.4 by W1.4, unless otherwise indicated.

2.2 FABRICATION

A. General

1. Steel pan stair work must be fabricated by an experienced manufacturer in accordance with 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 strains and stresses to which material will be subjected.

2. Fabricate shop assemblies in largest practical sizes to minimize field work. Provide exposed surfaces clean and free from all dirt, stains, grease marks, scratches, waves, dents, buckles, tool marks, rattles, and other objectionable defects which mar appearance or use of finished work.

3. Cutting: Cut materials by sawing, shearing, or blanking. Flame cutting will be permitted when ground back to clean edges. Make cuts accurately, clean, sharp and free of burrs, without deforming adjacent metals.

4. Connections: Make connections with tight joints, capable of developing full strength of the members, flush. Locate joints where least conspicuous. Use concealed fasteners where possible. Weld or rivet shop connections; bolt, screw or weld field connections.

   a. Welding: Provide continuous welds except where spot welding is specifically permitted. Conform to the Standard Code of the American Welding Society. Exposed welds must be ground flush.
   b. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts, or upset thread ends. Provide flat and countersunk exposed bolts and screw heads, unless otherwise indicated on drawings. Remove projecting ends of bolts and screws. Punch or drill holes; do not burn.

B. Stairs and Platforms

1. Provide stringers, risers, sub-treads and platforms matching profiles as shown. Form tread pan and riser in a continuous piece to receive the finished tread; tread must be a minimum of twelve (12) gauge. Weld risers and treads to carrier angles welded to the structural steel stringers. Fasten countersunk bolts or stud welded clips through mesh for cement fill. Provide welded-on clips for the support of gypsum drywall soffits.

2. On intermediate platforms, provide metal bases formed of stringers. Miter and weld and grind smooth internal and external corners of metal bases. Form platform runs of minimum ten (10) gauge steel.

3. Countersink bolt heads and screws on finished surfaces or cut off flush with such surfaces.

4. Properly fit and securely fasten together all parts making exposed joints close fitting. Cut, drill, punch and tap as required for installation.

5. Make joints as strong and rigid as adjoining sections. Weld continuously along entire line of contact except where spot welding is indicated.

6. Separate dissimilar metals in or adjacent to work of this Section with a coat of bituminous paint on each surface prior to installation.

7. Closure and Filler Plates: Where indicated on drawings or as required, at least twelve (12) gauge sheet steel, securely fastened to top and bottom of stringer and adjacent wall, by welding or screws.

8. Struts, Hangers, Platform Headers and Subframing

    a. Provide supports as detailed and required, including all struts, clip angles, angles or hangers which are required and necessary for support of stair construction.
    b. Provide supports of size suitable for the support load, as required. Struts, angles and hangers must be supported by and directly connected to the structural framing. Struts and hangers, with their connections, must be concealed.
    c. Provide other inserts, anchors and/or other subframing as may be required to complete the stair construction and properly support it on the structural framing.

C. Handrails, Railings, Posts and Brackets

1. Provide steel pipe of size shown on drawings, Schedule 40. Use heavier weight pipes and/or reinforce pipes internally as required to meet performance standards given in paragraph 1.6 herein. Provide flush type, malleable or cast iron fittings. Provide steel wall brackets; design as detailed.

2. Handrail, post and railing spacing must meet New York City Building Code requirements.

3. Construction: Form direction changes in rails using solid bar stock or elbows. Shop weld connections except where expansion joints are required. Weld field connections for continuity. Ground all exposed welds smooth and flush.

    a. If elbows are not available for angles shown, form changes in direction by bending.
    b. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

4. Fabricate steel tubing with wall thickness of 0.120".

5. Anchor posts to steel with steel flanges, angle type or floor type as required by conditions, welded to posts and bolted to the steel supporting members.

6. Secure handrails to walls with wall brackets. Provide brackets as shown on drawings. For installation in drywall, furnish steel plate as specified in Section 09 21 16 "Gypsum Board Assemblies" to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown.

7. Anchor rail ends into adjacent walls with steel flanges welded to rail ends and anchored into the wall construction as described above.

2.3 SHOP PAINTING

A. Scope: Clean all ferrous metal and shop paint with one coat of specified ferrous metal primer.

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.

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 may 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.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Work in the field must comply with the same requirements as specified for shop work above.

B. Except where otherwise shown or specified for a particular item of work or for built-in work, fasten metal work to solid masonry with expansion bolts. Fastenings to wood plugs in masonry will not be accepted. Drill holes to the exact diameter of the bolts using a rotary drill for concrete and a percussion drill for other masonry. Thread screws full length to the head of the screw.

C. Provide connecting members needed for properly securing the work to masonry, drywall and structural framing, including bolts, machine screws, rods, hangers, inserts, sleeves, plates, anchors, expansion bolts, washers and other items as required. Furnish built-in items to drywall trades as required for proper anchorage.

D. Leave work exposed to view, including stair soffits, clean, smooth and neatly finished. Exposed welds must be dressed smooth.

E. Attach wall railings to the wall construction using bolts and anchors that meet performance standards.

F. Set posts plumb within 1/8" vertical tolerance. Install longitudinal members parallel with each other and with floor surface or slope of stair to a tolerance of 1/8" in ten (10) linear feet. Center lines of members within each run of railing must lie in the same vertical plane. Provide hairline field joints at connecting sections.

3.3 TOUCH-UP PAINTING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop coat, and paint exposed areas with same material used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

END OF SECTION 05 51 13

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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. Decorative metals.

B. Related Sections

1. Section 05 50 00 "Metal Fabrications"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. General: Work of this Section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least three (3) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality 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. All work shall be accurately and neatly fabricated, assembled, and erected.

C. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Work that cannot be permanently shop assembled, shall 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. 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 shall be returned to the shop for correction.

D. Mock-Up: Build mock-up of feature stair railing assembly.

1. See drawing set for scope and extents of mockup requirements.

1.4 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 1.2A, 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 1.2A 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 6-inch square samples of metal of same thickness and material indicated for the Work or profile of Work.

F. Contractor’s Licensed Engineer Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified 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.

1.5 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. Surfaces exposed to view that exhibit pitting, seam marks, roller marks, oil-canning, stains, discolorations, or other imperfections on the finished units will not be acceptable.

B. Exposed Steel (cold rolled)

1. Structural Shapes and Sheets: ASTM A 1008.

2. Strip: ASTM A 109.

C. 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.

D. Fasteners: Furnish basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Provide Phillips square drive screws for exposed fasteners, unless otherwise indicated.

E. 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.

F. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

G. 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.

H. 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.

I. 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 the 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: Perform welding in accordance with recommendations of the American Welding Society with electrodes and/or methods recommended by the manufacturers of the metals being welded. Provide continuous welds except where spot welding is specifically permitted. Ground flush and dress smooth welds exposed to view and 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. Perform welds on or behind surfaces which will be exposed to view 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. Provide flat and countersunk bolts and screw heads where shown to be exposed to view. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.

D. Operating Mechanism: Fabricate, assemble and install operating devices, mechanism and hardware used in connection with this work. Adjust 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 ornamental 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, ensure that all surfaces exposed to view are 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, with 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. Provide exposed fastenings, where permitted, of the same material, color and finish as the metal to which applied, unless otherwise indicated, and of the smallest practicable size.

I. Provide materials 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. Provide bent items 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 inch.

2. Knife Edge Bends: Back-cut and back bevel sheets to attain sharpest bend possible, with maximum radius of 1/32 inch.

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. Blackened Steel

1. Comply with AMS 2485K finish.

2. Provide blackened steel 3-coat system for AESS and exterior railings.

2.4 PROTECTION

A. Provide necessary protection to all exposed surfaces of ornamental metal work, so as to prevent damage, staining, discoloration, abrasion, etc., to these surfaces from time of shipment from factory to substantial completion of work of this project. Protection shall 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 ornamental metal work from damage during subsequent construction activities.

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 shall be of such sizes and shapes as indicated on the drawings, or as required to suit the conditions, and shall 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.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

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. Ensure that shop fabricated ornamental metal items will properly fit the field condition. In cases where the shop fabricated ornamental metal items do not fit the field condition, return the item to the shop for correction.

B. Attachments

1. Unless otherwise indicated, work to be built into concrete or masonry shall be anchored with shop welded on galvanized steel strap anchors; work to be attached to concrete or masonry shall be anchored by bolts into embedded inserts or expansion shields; work attached to structural steel shall be anchored by welds or bolts; work attached to metals other than structural steel shall be anchored by bolts or

screws. Power actuated fasteners not permitted unless approved by the Commissioner. Provide all supplementary parts necessary to complete each item of work of this Section.

2. All attachment devices shall be of type, size and spacing to suit condition and as approved by the Commissioner. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view shall be concealed, unless indicated otherwise. Where bolts or screws are permitted in work exposed to view, they shall be oval head and counter sunk, unless otherwise noted, with projecting end cut off flush with nuts, or adjacent material, and shall 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. 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.

E. Install concealed gaskets and joint fillers as the work progresses, so as to make the work soundproof or lightproof as required.

F. 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.

G. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.

H. 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.

END OF SECTION 05 70 00

SECTION 05 73 00 - DECORATIVE METAL RAILINGS

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. Decorative metal railings.

B. Related Sections

1. Section 05 50 00 "Metal Fabrications"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. General: Work of this Section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least three (3) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality 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. All work shall be accurately and neatly fabricated, assembled, and erected.

C. Mock-Up: Build mock-up of feature stair railing assembly.

1. See drawing set for scope and extents of mockup requirements.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Shop Drawings: Submit for all items of work, at full scale as far as practical, showing metal thicknesses, arrangement of components, of joining, of jointing, details of all field connections and anchorages, diagrams and details explaining provisions for thermal movement, fastening and sealing methods, and support methods, metal finishes and all other pertinent information.

C. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of same thickness and metal indicated for the work.

1. 6" long sections of each different linear railing member, including handrails, top rails and posts.

2. Fittings and brackets.

3. Welded connections.

4. Assembled samples of railings, made from full size components, including top rail, post and handrail. Show method of finishing members at intersections. Samples need not be full height.

D. Provide signed and sealed calculations by a Professional Engineer licensed in the State of New York, demonstrating compliance with structural performance for exterior railing system per New York City Building Code.

1.5 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.

1.6 PRODUCT HANDLING

A. Finished Materials: Protect finishes against soiling, staining or damage from scratches and abrasion. Maintain protection during construction until project completion or as otherwise directed by Commissioner.

1. Provide wrappings, strippable coatings or other means approved by Commissioner.

2. During construction, remove protection for visual observation of finish as directed by Commissioner and replace to maintain protection.

1.7 PERFORMANCE STANDARDS

A. Structural Performance of Handrails and Railings: Provide handrails and railings complying with requirements per New York City Building Code and accessibility standard.

B. Accessibility Standard: Comply with applicable provisions in the USDOJ's 2010 ADA Standards for Accessible Design and ICC A117.1-2009.

C. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in engineering, fabricating, and installing handrails and railing systems to prevent buckling, opening of joints, overstressing of components and connections, damage to adjoining construction, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 120 deg F ambient, 180 deg F material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wire Mesh Guardrails: Webnet by Jakob Inox

1. Material: ASTM A 492 Type 316 stainless steel 7 x 7 wire rope joined with seamless ferrules.

2. Cable Diameter: 2.0mm.

3. Mesh Aperture Dimensions: As indicated on drawings.

4. Mesh Perimeter Finishes: Closed loop with loose ferrules.

5. Direction (Grain) of Mesh: As indicated on drawings.

6. Seamless AISI 316L stainless steel ferrule.

B. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work.

1. Pipe: ASTM A 312, Grade TP 316L.

2. Sheet, Strip, Flat Bar and Plate: ASTM A 666, Type 316L.

3. Tubing: ASTM A 554, Grade MT 316L.

4. Castings: ASTM A 743, Grade CF 8 or CF 20.

5. Bars and Shapes: ASTM A 276, Type 316L.

C. Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

D. 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.

E. Fasteners for Interconnecting Handrails and Railing Components: Furnish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.

F. Fasteners for Anchoring Handrails and Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads. Fasteners shall be fabricated from Type 316 stainless steel.

G. Erosion-Resistant Anchoring Cement: Factory packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.2 FABRICATION

A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than those required to support structural loads.

B. Assemble handrails and railings in 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. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

C. Form changes in direction of members as detailed or, if not detailed, by either of the following methods:

1. By radius bends of radius indicated.

2. By flush radius bends.

3. By bending.

4. By insertion of prefabricated flush elbow fittings.

D. Welded Connections: Fabricate stainless steel handrails and railing systems for connection of members by welding, except as otherwise indicated. Limit non-welded connections to connections that cannot be made in the factory due to size or handling limitations and similar considerations. For connections made during fabrication, weld corners and seams 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 welding flux immediately.

4. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe or tube to which end is joined, and weld all around.

5. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

E. Brackets, Flanges, Fittings and Anchors: Provide manufacturer’s standard wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing system members to other construction.

F. Provide inserts and other anchorage devices to connect handrails and railing systems to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.

G. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

H. Ease exposed edges to a radius of approximately 1/32", unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.

I. Cut, reinforce, drill and tap components, as indicated, to receive finish hardware, screws, and similar items.

J. Provide weep holes, or another means to evacuate entrapped water, in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources.

K. Fabricate joints that will be exposed to weather in a manner to exclude water.

L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.

M. Close exposed ends of pipe by welding 3/16" thick stainless steel plate in place or with prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4" or less.

N. Fillers: Provide stainless steel sheet or plate fillers, of thickness and size indicated or required to support structural loads of handrails, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses to produce adequate bearing to prevent bracket rotation and overstressing substrate.

2.3 STAINLESS STEEL FINISHES

A. Remove or blend tool and die marks and stretch lines into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

C. Finish: No. 6 satin, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required to install handrails and railings. Set handrails and railings accurately in location, alignment, and elevation; measured from established lines and levels and free from rack.

1. Do not weld, cut, or abrade surfaces of handrail and railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

2. Set posts plumb within a tolerance of 1/16" in 3 feet.

3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4" in 12 feet.

C. Adjust handrails and railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

3.4 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2" beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6" of post.

3.5 ANCHORING POSTS

A. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:

B. Form or core-drill holes not less than 5" deep and 3/4" larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:

1. Non-shrink, non-metallic grout or anchoring cement.

C. Cover anchorage joint with flange of same metal as post, attached to post as follows:

1. Welded to post after placing anchoring material.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

3.6 ANCHORING RAILING ENDS

A. Anchor railing ends into concrete and masonry with round flanges connected to railing ends and anchored into wall construction with post installed anchors and bolts.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.

1. Weld flanges to railing ends.

3.7 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2" clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

2. For hollow masonry anchorage, use toggle bolts.

3. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed reinforcements using self-tapping screws of size and type required to support structural loads.

3.8 PROTECTION

A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

END OF SECTION 05 73 00

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SECTION 06 10 00 - ROUGH 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.
2. Plywood backing panels for telephone and electrical closets.
3. Rough hardware.
4. Installation only of finish hardware.
5. Installation only of doors and hollow metal frames.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 06 40 23 "Interior Architectural Woodwork"
3. Section 07 21 00 "Thermal Insulation"
4. Section 07 52 13 "Atactic-Polypropylene-Modified Bituminous Membrane Roofing"
5. Section 08 11 13 "Hollow Metal Doors and Frames"
6. Section 08 71 00 "Door Hardware"
7. Section 08 80 00 "Glazing"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Assurance" heading.

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. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.

F. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

1.4 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 New York City Building Code and that treatment will not bleed through finished surfaces.

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 shall 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. All items specified in Section 08 71 00, Door Hardware, shall be received, accounted for, stored and applied under this Section.

H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be 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 shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.

2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, 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 shall be S4S, S-Dry, complying with PS-20.

3. Plywood and rough carpentry for telephone and electrical 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 shall be fire retardant treated to comply with the AWPA 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 AWPA 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 shall comply with AWPA 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 shall be further treated in accordance with the AWPA 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 for Treated Woods and Exterior Use: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

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 requirements governing execution.

3.2 INSTALLATION OF FINISH HARDWARE

A. Hardware shall 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 shall 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 shall 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 substantial completion or occupancy of a space or area, return to the work during the week prior to substantial completion 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.

3.3 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.

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, 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 shall 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 07 21 00, "Thermal Insulation."

5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 04 20 00 "Unit Masonry" for installation of frames in masonry walls.

6. 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.

7. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.

8. 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.

9. Glazing: Comply with installation requirements in Section 08 80 00 "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.

3.4 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 shall be continuous wherever required, whether or not so indicated.

2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall 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 shall 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 shall 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 shall 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 shall 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. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings or secured by any other proposed flush surfaced fastenings.

5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.5 TELEPHONE AND ELECTRICAL EQUIPMENT MOUNTING BOARDS

A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electrical equipment rooms in accordance with ConEdison requirements.

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 shall be butted with 1/16" space between without lapping.

3.6 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. Inserts to secure wood nailers to concrete shall be 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. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

END OF SECTION 06 10 00

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

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. Wood millwork and counters with plastic laminate finish.
2. Hardware for architectural woodwork.
3. Wood slat ceiling.
4. Shelving.
5. Wood framing and rough lumber as required for work of this Section.
6. Wood grounds, blocking, nailers, furring as required for work of this Section.
7. All rough hardware and fastenings for work of this Section.
8. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
9. Back painting as specified herein.
10. Shop finish of work of this Section, except items indicated herein to be shop primed only.

B. Related Sections

1. Section 06 10 00 "Rough Carpentry"
2. Section 07 92 00 "Joint Sealants" for caulking between architectural woodwork and any wall, floor, or ceiling joints.

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. The quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards" (AWS), 1st Edition, dated October 1, 2009, shall apply to all workmanship, including materials and installation, for architectural woodwork, and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWS unless otherwise modified herein.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Shop Drawings

1. Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.

2. Shop drawings shall show all finish hardware, anchors, fastenings and accessories.

3. Shop drawings shall show all jointing, joint treatment and butt jointing in veneers and plastic laminate.

4. Shop drawings for cabinet work must show centerline height and horizontal location of all required internal wall blocking.

5. Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.

C. Samples: Submit samples of each of the following items:

1. Plastic laminate, twelve (12) inches square, including a section of outside corner.

2. Cabinet hardware.

1.5 QUALIFICATIONS

A. The work of this Section shall be provided by a firm having a minimum of three (3) years' experience on projects of similar size and quality to that specified and shown.

1.6 DELIVERY, STORAGE AND HANDLING

A. All materials and work of this Section shall be protected from damage from time of shipment from shop to substantial completion of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.

B. Keep all finish carpentry, millwork, and cabinet work under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinet work before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection.

C. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.

1.7 JOB CONDITIONS

A. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.

B. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.

C. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior doors in place, HVAC systems operational, and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.

D. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

PART 2 - PRODUCTS

2.1 BASIC REQUIREMENTS

A. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of nine (9) to twelve (12) percent for exterior work and six (6) to eleven (11) percent for interior work.

B. Compatibility of Grain and Color: Commissioner reserves the right to select materials for best compatibility between visually related members and veneers.

C. Machine and sand woodwork to comply with requirements of Standards for specified grade.

D. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.

E. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.

F. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.

2.2 GENERAL - MATERIALS

A. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Architectural Woodwork Institute and shall bear the labels and certificates from the AWI certification program indicating that woodwork complies with requirements of grades specified, and a mark of mill identification.

B. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 06 10 00, Rough Carpentry.

C. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.

D. Lumber: AWS Section 3 with the following requirements:

1. Hardwood for Opaque Finish: Any hardwood which, when finished, will not show any grain, imperfection or other surface defects when used with the opaque finish specified.

E. Plywood: AWS Section 4; veneer core, particleboard or plywood core unless otherwise specified, and with the following requirements:

1. Hardwood: Premium Grade, face veneers as shown or specified.

2. Particleboard: Premium Grade, fire retardant for wall paneling only. In addition, particleboard and MDF shall be certified to the following EPP CPA 3-08 formaldehyde emission limits:

a. Particleboard meets 0.18 ppm.
b. MDF meets 0.21 ppm.

3. Edges: Banded with hardwood in accordance with Premium Grade Standards.

2.3 PLASTIC LAMINATE

A. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick. Color, pattern and finish as scheduled

1. Basis-of-Design Product: Subject to compliance with requirements, provide Abet Laminati; product indicated on Drawings or comparable product by one of the following:

a. Formica
b. Nevamar
c. WilsonArt
d. Or approved equal.

B. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick.

C. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.

2.4 METAL

A. Steel

1. Structural Steel Shapes and Plates: ASTM A 36.

2. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters.

B. Primer for Unexposed Metal: Zinc chromate primer.

2.5 MISCELLANEOUS PRODUCTS

A. Fasteners

1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.

2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.

3. Anchors: Type, size, material and finish as required for the condition of use.

4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

B. Adhesives

1. For Laminating Plastic Laminate Surfaces: Urea resin, Type II, as recommended by fabricator.

2. For All Other Uses: Polyvinyl acetate resin emulsion or other type as recommended by the fabricator.

2.6 CABINETS WITH PLASTIC LAMINATE FINISH

A. General

1. Fabricate all cabinetry and millwork to the "Premium Grade" standards of the AWS, Section 10.

2. Face construction of cabinets shall be "Flush Overlay."

3. Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.

4. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.

5. Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

B. Plastic Laminate

1. Plastic Laminate for Horizontal Surfaces: 0.050" thick, general purpose type (high pressure).

2. Plastic Laminate for External Vertical Surfaces: 0.028" thick, general purpose type (high pressure).

3. Plastic Laminate for Post Forming: 0.042" thick, post forming (high pressure).

4. Plastic Laminate for Cabinet Linings: 0.020" thick, cabinet liner (high pressure).

5. Plastic Laminate for Concealed Panel Backing: 0.020" thick, backer type (high pressure).

6. Plastic Laminate Colors and Patterns: As scheduled.

C. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.

D. Material Thicknesses: See drawings for general material thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".

E. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work.

F. Manufacturer is responsible for rigidity and structural stability.

2.7 HARDWARE

A. Architectural Woodwork Hardware: Provide millwork hardware as selected by Commissioner.

2.8 FABRICATION - GENERAL

A. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.

B. Fabricate architectural woodwork to dimensions, profiles, and details indicated.

C. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners. Where necessary for fitting at site, provide for scribing, trimming and fitting.

D. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.

E. Details indicate the required type and quality of construction. Modifications to conform to manufacturer's standards will be considered provided that they comply with the Contract Documents and maintain the profiles shown.

F. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.

G. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.

H. Comply with AWI, Premium Grade, for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.

I. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

2.9 FABRICATION - SPECIFIC ITEMS

A. Millwork

1. Include all preparations for mechanical, electrical, telephone and plumbing work required.

2. Provide cabinet hardware for millwork as shown.

3. Provide dust panels in body webs and between drawer units.

4. Provide wood veneers for exposed surfaces as specified herein before.

5. Hollow core doors will not be permitted unless specified by Commissioner.

6. Provide matching veneers for edge treatments of case body members where transparent finishes are indicated or specified.

7. Provide drawers with slides as specified. Drawers shall not rest on web body frames.

8. Provide wood veneers for transparent finish, of matching and continuing grain, for drawer and door edges.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 FRAMING

A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.

B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

3.3 GROUNDS, BLOCKING, NAILERS AND FURRING

A. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

3.4 ROUGH HARDWARE

A. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.

B. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than sixteen (16) inches apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Commissioner.

C. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

3.5 INSTALLATION OF CABINET FINISH HARDWARE

A. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Ensure operation without forcing.

B. After preliminary fitting of hardware, remove trim for painting and finishing work; then reinstall the hardware in a permanent manner.

C. Upon completion of the work, before substantial completion of the building by the City of New York, the Contractor shall, in the presence of the Commissioner, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the Commissioner and the City of New York.

3.6 GENERAL INSTALLATION

A. Wall anchorage and general installation procedures for cabinetry work shall conform to AWS Section 10, Article entitled "Execution," Sub-Article 6.1, with all related sub-paragraphs.

B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work; refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

3.7 CABINET WORK AND MILLWORK

A. General

1. Materials and workmanship shall conform to the Quality Standards of the Architectural Woodwork Institute specified herein and to the drawings.

2. Fabricate all cabinet work and millwork completely in the shop, in complete and/or as large units as practical, leaving only fitting, assembly, installation and a minimum of fabrication and finishing to be done at the building. Assembled work shall be rigidly secured and permanently fastened together with concealed fasteners.

3. Afford the Commissioner every facility for inspection of work at shop or mill at such times as the Commissioner may select.

4. As far as practicable, use concealed fastenings for joining and assembling the work. Where this is impossible, the means of securing shall be placed in inconspicuous places and methods of joining and assembling submitted for Commissioner’s approval prior to fabrication.

5. Mill all finish wood accurately to detail, with clean cut moldings, profiles and lines, machined, sanded smooth, housed, jointed, blocked, put together in the best manner, with provision for swelling and shrinkage, and to ensure the work remaining in place without warping, splitting or opening of joints.

6. Cut trim to dimensions and profiles shown, from solid stock.

7. Make all trim and the like in single lengths wherever possible; joints mitered, glued and splined. Continuous members shall have tight flush joints, doweled or splined and glued.

8. Make all joints hairline tight, fitted accurately and joined with hardwood splines or dowels, glued together, or by other method approved by the Commissioner. Use screws, not nails, for fastenings.

9. Gluing shall, where practicable, be by the hot plate press method and glued surfaces shall be in close contact throughout. Glue stains on finished work will not be permitted.

10. Cover surface fastenings, where permitted, with matching wood plugs or wood putty. Finish exposed edges of plywood with matching solid stock. Lock miter external corners; tongue and groove internal corners to allow for contraction and expansion.

11. Machine sand with grain, finish with hand sanding, leave exposed surfaces free from machine or tool marks that will show through the finish.

12. Work which adjoins drywall, concrete, or other finish shall be fitted and scribed in a careful manner and ample allowance shall be given for cutting and scribing.

13. Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.

B. Cabinet Work: Provide all items of cabinet work indicated on drawings and as herein specified.

1. Tops, sides, backs, bottoms, dividers, shelves, fronts, doors and drawer fronts shall be of plywood or flakeboard core, with the specified wood veneer or plastic laminate as indicated on drawings.

2. Drawer sides and backs shall be 1/2" thick solid clear selected white birch, suitable for clear finish. Drawer bottom shall be 3/8" thick plywood with clear selected white birch veneers, suitable for clear finish.

3. Cabinet doors and drawers shall be flush mounted.

4. Adjustable shelves in cabinets shall have grommets spaced 2" o.c.

5. Fixed shelves shall be dadoed into side supports and glued.

6. Shelves shall be 3/4" thick for spans up to 30"; for spans in excess of 30" to 48" shelves shall be 1" thick.

7. All cabinets shall have closed top, sides, bottom, and back with veneers to match face work. Cabinets to fit accurately into indicated locations; scribe moldings permitted only where indicated.

8. Countertops, counters, counter fronts, shelves, etc., indicated on drawings to have plastic laminate, shall have plastic laminate shop applied to 3/4" thick core, with plastic laminate backing sheet on underside or back of countertops, counters and shelves. Plastic laminate shall be pressure laminated to core with laminate at external corners. Provide concealed wood framing to support plastic laminate counters, securely fastened to wall and to underside of counters.

C. Countertops shall 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.

3.8 PAINTING AND FINISHING

A. General: All painting and finishing work of this Section shall be shop applied, unless otherwise noted, as specified below. All painting and finishing shall match approved samples. Field finish painting, where specified below, shall be as specified in Section 09 90 00, Painting and Coating.

B. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil based paint prior to installation, shop applied where practicable.

END OF SECTION 06 40 23

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 solid surfacing fabrications.

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.

C. Shop Drawings

1. Submit shop drawings of all solid surfacing fabrications specified and indicated on the drawings.

2. Indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Indicate all materials, thicknesses, jointing and finishes.

3. Show all finish hardware, anchors, fastenings and accessories.

D. Samples: Submit 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.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Allowable Tolerances:

1. Variation in Component Size: + 1/8".

2. Location of Openings: + 1/8" from indicated location.

C. The work of this Section shall be provided by a firm having a minimum of three (3) years' experience on projects of similar size and quality to that specified and shown.

1.5 WARRANTY

A. Warranty: The manufacturer shall warrant to the City of New York that the manufacturer will, at own option, repair 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 MATERIALS

A. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124.3, Type Six, and ISFA 2-01 "Classification and Standards for Solid Surfacing Material" as published by the International Surface Fabricators Association (ISFA).

1. Basis-of-Design Product: Subject to compliance with requirements, provide E.I. duPont de Nemours and Company; Corian or comparable product by one of the following:

a. Formica Corporation
b. Avonite, Inc.
c. Or approved equal.

2. Color: Pearl Gray.

3. Thickness: 1/2" thick unless otherwise noted.

B. Provide counters adhesively joined with no exposed seams, having edge details shown on drawings.

2.2 ACCESSORY PRODUCTS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. 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. Verify in field all installation conditions prior to fabrication.

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. Repair or reject defective and inaccurate work.

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 requirements governing execution.

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.

END OF SECTION 06 61 16

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SECTION 07 13 26 - SELF-ADHERING SHEET 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. Section includes:

1. Sheet membrane waterproofing for foundation wall surfaces.

2. Sheet membrane waterproofing for blindside of foundation wall surfaces.

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: Typical installation details, showing details at flashings, at terminations, at joints, at intersection of horizontal and vertical surfaces, and at penetrations in membrane system.

C. Samples - Submit

1. Membrane, 6" x 6" samples of each membrane.

2. 6" x 6" sample of flashing.

3. 6" x 6" sample of drainage board.

D. Manufacturer's Literature: Submit manufacturer's technical, safety data sheets, and installation literature for all materials of this Section. Submit Independent Test data indicating that membrane meets properties specified herein.

E. Certification: Submit per Article 1.4.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements.

B. Preinstallation Conference: Approximately 2 weeks prior to scheduled commencement of waterproofing installation, meet at Project site with Waterproofing Installer; preparer of substrate to receive waterproofing; installers of other work in and around waterproofing that must precede, follow, or penetrate waterproofing (including Mechanical and Electrical Installers as applicable); Commissioner; City of New York; and

waterproofing manufacturer's representative to review materials, procedures, schedules, and other requirements and conditions related to installing waterproofing.

C. Qualifications of Subcontractors

1. Subcontractors: All work of this Section shall be performed by a subcontractor who is approved by the manufacturer of the waterproofing material.

2. Qualifications of Subcontractors: Subcontractors shall submit evidence of being bona fide waterproofing subcontractors, for a period of not less than three (3) years, and that they are approved by the manufacturer of the waterproofing material for the installation of the manufacturer's material in accordance with the requirements of this Section.

   a. Subcontractor shall submit a letter from manufacturer of waterproofing material stating that subcontractor is approved by the manufacturer for the application of the waterproofing systems specified and accepted for use on the Project.
   b. Letter shall certify that the subcontractor has previously and satisfactorily applied the waterproofing systems specified herein on jobs of similar size and scope, under manufacturer's supervision.
   c. Letter shall be on manufacturer's letterhead and shall be signed by an officer of the company, not by a local sales representative.

D. Manufacturer's Representative/Contractor's Certification

1. Representative of the waterproofing material manufacturer shall be 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 shall be required to make sure that the workers for waterproofing systems on the site of the Project are fully instructed in the handling and application of all the materials and shall 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.

1.5 JOB CONDITIONS

A. No application of waterproofing shall commence or proceed during inclement weather, or the threat of imminent precipitation.

B. All surfaces to receive the system shall be thoroughly dry and free of dew or frost.

C. Materials shall be stored until time of mixing at temperatures above 60 deg. F. to maintain a consistency suitable for mixing. Do no work below 40 deg. F.

D. Prior to and during application, all dirt and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.

E. Surfaces not designated to receive the system shall be properly masked or otherwise protected against accidental spillage or application of the material to those areas.

1.6 STORAGE OF MATERIALS

A. All materials shall be stored in their original tightly sealed containers or unopened packages; shall be clearly labeled with the manufacturer's name, brand name and number, and batch number of the material with expiration date where appropriate.

B. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area.

C. Material shall be stored out of the weather in a clean, dry area.

1.7 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 installers 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 placement.

1. Take and maintain necessary preventive 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.

1.8 FIELD QUALITY CONTROL

A. Construction Traffic:

1. Limit construction traffic over completed membrane.

2. Provide 1/2 in. plywood protection layer, where construction traffic is unavoidable.

B. Inform Commissioner in writing on a daily basis of any of the following events. State specific location of each occurrence.

1. Buckling to the waterproofing and other deformations as a result of ground water events.

2. Leakage through the finished waterproofing installation.

3. Damage by other trades.

C. Provide Manufacturer’s Representative’s report (prior to backfill) stating that the waterproofing has been inspected and is acceptable and eligible for manufacturer’s warranty.

1.9 WARRANTY

A. The manufacturer of the waterproofing system executed under this Section warrants the waterproofing system to be watertight and free from defects in materials and workmanship for a period of ten (10) years from date of Substantial Completion, and that they, at their own expense, repair and/or replace all other work which may be damaged as a result of such defective work, and which becomes defective during the warranty period.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

A. For accessible foundation walls, provide the following:

1. Product: Subject to compliance with requirements, provide one of the following:

a. GCP Applied Technologies; Bituthene 4000 sheet waterproofing membrane, 60 mils thick and Bituthene Liquid Membrane 60 mils thick, for flashing.
b. Carlisle Coatings & Waterproofing; CCW MiraDri sheet waterproofing membrane, 60 mils thick, and CCW LiquiSeal V Liquid Membrane.
c. WR Meadows; MEL-ROL sheet waterproofing 60 mils thick and BEM 60 mils thick, for flashing, with MEL-ROL Sheet Membrane accessory products- MEL-PRIME NE or MEL-PRIME WB, BEM, Pointing Mastic.
d. Or approved equal.

B. At blind side waterproof conditions, provide the following:

1. Product: Subject to compliance with requirements, provide one of the following:

a. GCP Applied Technologies; Preprufe 160R Plus system
b. Carlisle Coatings & Waterproofing; CCW MiraPly V with SeamLock Technology
c. WR Meadows; PRECON composite sheet membrane with Plasmatic Matrix
d. Or approved equal.

C. HDPE membrane shall have a protective layer to protect the membrane from the weather and U.V. for up to 56 days before casting concrete against it.

D. Latex/water based primer specifically formulated to provide adhesion of Waterproofing Membranes.

1. Product: Subject to compliance with requirements, provide one of the following:

a. GCP Applied Technologies; Bituthene 4000 Conditioner
b. Carlisle Coatings & Waterproofing; CCW 702 LV Adhesive
c. WR Meadows; MEL-PRIME NE/Solvent based or MEL-PRIME WB/water based used as adhesive for MEL-ROL sheet waterproofing
d. Or approved equal.

E. Bituthene Elastomeric Mastic: Rubberized asphalt base mastic.

F. Tape: Double sided synthetic adhesive tape.

G. Protection Board

1. Product: Subject to compliance with requirements, provide one of the following:

a. GCP Applied Technologies; 1/4" thick semi-rigid protection board, Bituthene Asphaltic Hardboard
b. Carlisle Coatings & Waterproofing; CCW Protection Board HS
c. WR Meadows; WR Meadows 1/4" PC-3
d. Or approved equal.

H. Two-component 100% solids trowel grade asphalt modified urethane.

1. Product: Subject to compliance with requirements, provide one of the following:

a. GCP Applied Technologies; Bituthene Liquid Membrane
b. Carlisle Coatings & Waterproofing; CCW LiquiSeal V
c. WR Meadows; MEL-ROL Liquid Membrane
d. Or approved equal.

I. Drainage Board/Composite: Prefabricated dimpled polystyrene drainage core with a non-woven filter fabric on one side and a polymer film on the reverse side

1. Vertical Applications

a. Product: Subject to compliance with requirements, provide one of the following:
1). GCP Applied Technologies; Hydroduct 220
2). Carlisle Coatings & Waterproofing; CCW MiraDrain 6000
3). WR Meadows; MEL-DRAIN 5035
4). Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSPECTION

A. Examine the areas and conditions where membrane waterproofing 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. Starting of work implies acceptance of substrate.

3.3 PREPARATION OF SURFACES TO RECEIVE WATERPROOFING

A. Conform to the requirements of specified manufacturer.

B. Earth or crushed stone substrates shall be compacted to produce an even, sound substrate. Loose aggregate, sharp protrusions and standing water shall be removed.

3.4 INSTALLATION

A. General: Conform to recommendations and published specifications of the manufacturer, including environmental requirements and preparation requirements to receive waterproofing.

B. Foundation Walls (Accessible Walls)

1. General: The membrane, when in place must withstand a minimum static ground water pressure in accordance with ASTM D5385

2. Priming: Application of primer shall be limited to what can be covered with waterproofing membrane in a given work day. Primed areas not covered by membrane during the work day will be reprimed. Apply primer by spray, roller or brush at a rate of 250 - 350 sq. ft. per gallon. Roller shall be natural material such as lamb's wool, having a nap of approximately one inch. Primer shall be applied to a clean, dry, frost-free and dust-free surface. Sufficient primer must be used on the day surface to condition it to a dust-free state suitable for the application of waterproofing membranes.

   a. Surface conditioner should not be applied below 25 deg. F. on vertical surfaces. Allow primer to dry 30 minutes. Conditioner is considered dry when the substrate returns to its original color.
   b. Re-prime areas that become dusty or dirty prior to membrane installation.

3. Membrane Installation: Apply 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 a least 2-1/2". Press all membrane in place with heavy hand pressure or rollers during application.

4. Sealing Edges: Waterproofing membrane shall 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 mastic to all vertical and horizontal terminations. Liquid membrane can be used as an alternative method at the Contractor's option.

5. 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 membrane. Slit any fish mouths, overlap the flaps, and repair with a patch of membrane and press or roll in place. The edges of the patch shall be sealed with a troweling of mastic. Laps within 12" of all corners shall be sealed with a troweling of mastic.

6. Corner Forming: Outside corners must be free of sharp edges. Inside corners shall receive a fillet formed with liquid membrane, latex modified cement mortar mixed with cement mortar or epoxy mortar. Do not use fiber or wood cants. One of two methods may be used for treating corners at the Contractor's option:

   a. Apply liquid membrane 6" in each direction from the corner and form a fillet with a minimum 3/4" face.
   b. Install an 11" minimum strip of waterproofing membrane centered on the corner. Install membrane over the treated inside and outside corners.

7. Over waterproofing, apply drainage composite board by adhering board to cured membrane using tape or adhesive per manufacturer’s recommendations; lap all edges 4” and conform to the following:

a. Install drainage layer directly over the membrane. Start at the low points on the wall and shingle all laps to the flow of water.
b. Splice drainage panels together by butting longitudinal edges of adjacent sheets and peeling back fabric to expose the cores of the panels. Install precut “lock strips” consisting of 4 dimple x 5 dimple sections of the drainage panel centered on the joint between the panels and spaced every 10 dimples along the length of the joint. Snap dimples of “lock strip” to dimples of each panel and reattach fabric over the panel joint.
c. Cut the core of the drainage panels around penetrations, and cut an 'X' in the filter fabric and tape the fabric to the sides of the penetration.
d. Cover all terminal edges of the drainage composite with an integral fabric flap by tucking the fabric around the edge of the core and adhering the fabric to the bottom of the core.

3.5 INSTALLATION OF WATERPROOFING FOR BLINDSIDE WALLS

A. General: Install adhesive coated HDPE composite sheet according to waterproofing manufacturer's written instructions.

1. Install drainage layer directly over the membrane. Start at the low points on the wall and shingle all laps to the flow of water.

2. Splice drainage panels together by butting longitudinal edges of adjacent sheets and peeling back fabric to expose the cores of the panels. Install precut “lock strips” consisting of 4 dimple x 5 dimple sections of the drainage panel centered on the joint between the panels and spaced every 10 dimples along the length of the joint. Snap dimples of “lock strip” to dimples of each panel and reattach fabric over the panel joint.

3. Cut the core of the drainage panels around penetrations, and cut an “X” in the filter fabric and tape the fabric to the sides of the penetration.

4. Cover all terminal edges of the drainage composite with an integral fabric flap by tucking the fabric around the edge of the core and adhering the fabric to the bottom of the core.

B. Preparation

1. Surfaces to receive blind side membranes must be smooth and sound, with no gaps or voids in excess of 1/2 in. Earth and stone substrates must be compacted to produce an even, solid substrate. If required by membrane manufacturer, provide an additional layer of underlayment protection board over sharp or angular stone substrates. Surfaces to receive waterproofing shall be thoroughly dry and free of moisture.

2. General: Comply with manufacturer's instructions for preparing surface including joint or crack treatment.

3. Apply primer to substrate surfaces at rate recommended by manufacturer of primary waterproofing materials. Prime only area that will be covered by waterproofing membrane in same working day. Reprime areas not covered by waterproofing membrane within 24 hours.

C. Wall Applications

1. Refer to manufacturer’s literature for complete installation instructions but not limited to the following:

a. Apply Drainage Composite to a point 6" below grade line. Fasten drainage composite to the adjacent buildings foundation wall or soil retention system.
b. Peel back bottom flap of filter fabric and place core behind discharge pipe. Wrap loose filter fabric over and around discharge pipe. Tuck excess filter fabric behind pipe. Fold excess filter fabric at top termination down between drainage composite and membrane.
c. Apply membrane with the HDPE film facing the soil retention system or adjacent foundation. Remove the release liner and fasten membrane to Hydroduct drainage composite with large head nails or staples. All nail heads or staples must be covered with overlapping sheets of membrane.
d. Apply succeeding sheets by overlapping the previous sheet 3 inches along the uncoated edge of the membrane.
e. Overlap the ends of the membrane 3 inches. Apply Preprufe Tape centered over the end lap and roll firmly. Remove release liner.
f. Seal all transition, penetrations, tie down bracing and other conditions with initial membrane layer plus manufacturer's recommended accessory materials, prior to application of the full membrane.
g. Concrete must be poured within 30 days of membrane application. Protect membrane until concrete pour.
h. If membrane ties into a vertical membrane, leave an additional 12" flap of Preprufe membrane to tie into waterproof membrane.

3.6 SEAM REINFORCEMENT FOR HDPE COMPOSITE SHEETS ONLY

A. Provide a 6 in. strip of modified bituminous sheet membrane centered behind all laps.

B. At locations where a salvage edge is not present and at end laps, lap sheets 6 in., apply a 1/8 in. thick by 6 in. wide application of liquid membrane between sheets, to provide a 6 in. 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 in., apply a 1/8 in. thick by 12 in. wide application of fluid membrane between sheets, to provide a 12 in. 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. Repair of pre-applied sheet membrane

a. Scratch on white coating exposing underlying black surface 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 in. 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 in. of sound material around it, inject Liquid Membrane into puncture until Liquid Membrane backs out, and proceed with patch as space allows.

3.7 CLEAN-UP

A. Upon completion of the waterproofing system, the Contractor shall remove all equipment, material and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

END OF SECTION 07 13 26

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SECTION 07 19 00 - WATER REPELLENTS

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 water repellent coating applied to existing brick walls.

B. Related Sections

1. Section 04 01 20 "Restoration of Unit Masonry"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Installer: A firm with not less than three (3) years of successful experience in application of water repellents of types required on substrates similar to those of this project.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit manufacturer's specifications, installation instructions and general recommendations for water repellents. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements.

C. Samples: Submit sixteen (16) inch square samples of each substrate indicated to receive liquid water repellent, with repellent treatment as specified applied to half of each sample.

1.5 JOB CONDITIONS

A. Water and Substrate Conditions: Do not proceed with application of water repellent, except with written recommendation of manufacturer, when ambient temperature is less than fifty (50) degrees F., or when substrate surfaces have cured for less than a period of two (2) months, or when rain or temperatures below forty (40) degrees F. are predicted for a period of twenty-four (24) hours, or earlier than three (3) days after surfaces became wet from rainfall or other moisture sources, or when substrate is frozen, or at surface temperatures of less than forty (40) degrees F.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section, before, during, and after installation, and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.7 WARRANTY

A. Provide written warranty from the product manufacturer stating that materials and workmanship shall be free of defects (no water penetration due to failure of coating) for a period of ten (10) years from date of Substantial Completion, and the manufacturer shall remedy any defects in the work that occur within this time limit.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Siloxane, Penetrating Water Repellent: Clear water repellant coating containing 4% or more solids of oligomerous alkylalkoxysiloxanes; with alcohol, ethanol, mineral spirits, water, or other proprietary solvent carrier; and with 30 g/L or less of VOCs.

1. Basis-of-Design: Product: Subject to compliance with requirements, provide Prosoco; Sure Klean Weather Seal Siloxane PD or comparable product by one of the following:

a. Concrete Sealers USA
b. AGC Chemicals America, Inc.
c. Or approved equal.

B. Performance: Water repellents shall meet the following performance requirements as determined by testing on substrates representing those indicated for this Project.

1. Water Absorption: Minimum 90 percent reduction of water absorption after 24 hours for treated compared to untreated specimens when tested according to the following:

a. Concrete Masonry Units: ASTM C 140.
b. Brick: ASTM C 67.

2. Water-Vapor Transmission: WVT (grains/h ft^2) 1.222; permeance 2.99, according to ASTM D 6490.

3. Water Penetration and Leakage through Masonry: Minimum 90 percent reduction in leakage rate of treated compared to untreated specimens, according to ASTM E 514.

4. Durability: Maximum 5% loss of water-repellent performance after 2500 hours of weathering according to ASTM G 154 compared to water-repellent-treated specimens before weathering.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PREPARATION

A. Test Application: Prior to performance of water repellent work, including bulk purchase/delivery of products, prepare a sample application in an unobtrusive location and in a manner acceptable to

Commissioner, for purpose of demonstrating final effect (visual and physical/chemical) of planned installation. Proceed with work only after Commissioner's acceptance of test application.

B. Clean substrate of substances which might interfere with penetration/adhesion of water repellents. Test for moisture content, to ensure that surface is sufficiently dry.

C. Coordination with Sealants: Delay application of water repellents until installation of sealants has been completed in joints adjoining surfaces to be coated with repellent.

D. Protect adjoining work from spillage or blow over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass where there is possibility of water repellent being deposited on surfaces. Cover live plant materials with drop cloths. Clean water repellent from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.

3.3 INSTALLATION

A. Apply a heavy saturation spray coating of water repellent on surfaces indicated for treatment using low pressure spray equipment. Comply with manufacturer's instructions and recommendations, using airless spraying procedure unless otherwise indicated.

B. Apply a second saturation spray coating, repeating first application if required by manufacturer to meet warranty requirements. Comply with manufacturer's instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats.

END OF SECTION 07 19 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 and underslab insulation.
2. Exterior wall rigid insulation.
3. Miscellaneous blanket insulation.
4. Spray applied insulation.
5. Attachment devices.

B. Related Sections

1. Section 07 52 13 "Atactic-Polypropylene-Modified Bituminous Membrane Roofing"
2. Section 07 84 13 "Penetration Firestopping"
3. Section 09 21 16 "Gypsum Board Assemblies" for acoustical insulation.
4. Section 31 23 00 "Excavation and Fill"

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.

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.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged or otherwise not suitable for installation and replace with acceptable materials.

B. Take every precaution to prevent the insulation from becoming wet, cover with tarps or other weather/watertight sheet goods.

PART 2 - PRODUCTS

2.1 FOUNDATION WALL AND UNDERSLAB INSULATION

A. Provide extruded polystyrene board insulation equal to "Styrofoam" manufactured by Dow Chemical Co., or 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 shall have an aged R value of not less than 5/inch; shall be 2" thick unless otherwise noted on the drawings.

2.2 RIGID INSULATION

A. Provide mineral wool fiberboard insulation equal to "CavityRock DD" manufactured by Roxul, or equal by Thermafiber, Auralex or approved equal, conforming to ASTM C 612, Type IVB with a maximum flame spread and smoke developed indices of 0.

1. Boards shall be 16" wide x 96" long; boards shall be 3-1/2" thick unless otherwise noted on the drawings.

2. Insulation shall have an aged R value of not less than 4.3/inch.

2.3 MINERAL-WOOL BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fibrex Insulations Inc.

2. Owens Corning.

3. Roxul Inc.

4. Thermafiber.

5. Or approved equal.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 70 percent.

C. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 SPRAY APPLIED INSULATION

A. Provide two-component closed cell spray foam with a zero-ozone depleting HFC blowing agent; "CertaSpray Closed Cell Foam" by CertainTeed, polyurethane thermoset rigid foam, or equal by Monoglass, Icyene, BASF or Dow Chemical Company or approved equal, conforming to ASTM D 1622. Provide thermal barrier as required by New York City Building Code.

1. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.

2. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.

3. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75 degrees F/ 95 percent RH, 28 day.

4. Water Vapor Transmission: Less than 1.3 perm/inch when tested in accordance with ASTM E 96.

5. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.

6. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.

7. Smoke Developed: Less than 450 when tested in accordance with ASTM E 84.

8. Aged R Value per 2 inches: 6.2.

2.5 ACCESSORIES

A. Clips for Securing Insulation to Encountered Surfaces: Spindle anchor and washer type consisting of perforated metal plates with spindle welded to center and snap on washers. Spindle and washers shall receive a corrosion-resistant electro-zinc plating. Adhesives for securing clips in place shall be recommended by the approved clip manufacturer.

1. Manufacturers

a. Miracle Adhesives Corp.
b. Stic-Klip Mfg. Co., Inc.
c. Midwest Fasteners
d. Or approved equal.

B. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.

1. Ensure that all submitted products that will interface are both chemically and adhesion compatible.

C. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 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. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time. Maintain dryness by providing temporary protection (tarp, etc.) over insulation and other materials that are intended to be covered by the building envelope, but must remain open for a period of time during construction

C. 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.

D. 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.

3.3 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" 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" in from exterior walls.

3.4 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. 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", support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

3.5 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.

3.6 INSTALLATION OF SPRAY FOAM INSULATION

A. Apply spray foam insulation according to manufacturer’s written instructions.

B. Apply insulation by spray method, to uniform monolithic density without voids.

C. Apply to minimum cured thickness as indicated on the drawings.

D. Apply to achieve thermal resistance R-value as required.

E. Seal plumbing stacks, electrical wiring, and other penetrations.

F. Apply insulation to fill voids around doors and windows. Apply insulation to fill voids around accessible service and equipment penetrations.

G. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180 degrees F or greater.

H. Patch damaged areas.

END OF SECTION 07 21 00

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SECTION 07 24 00 - EXTERIOR INSULATION AND FINISH 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. Exterior insulation and finish system (EIFS) applied over CMU.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 07 84 13 "Penetration Firestopping"
3. 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

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements including conforming to standards referenced herein.
3. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades, including flashing details.
4. Manufacturer's recommended installation procedures which, when approved by the Commissioner, will become the basis for accepting or rejecting actual installation procedures used on the work.
5. Shop drawings shall contain the following statement: "Materials and methods of installation have been reviewed by the manufacturer and meet manufacturer's recommendations."
6. Confirmation that system meets wind load criteria.

C. Samples: Submit 24" x 24" samples of colors and textures available. Samples to be made utilizing tools and techniques proposed for installation.

D. Shop Drawings and Calculations: Provide shop drawings and calculations signed and sealed by a Professional Engineer licensed in the State of New York indicating that work of this Section meets or exceeds performance requirements specified.

E. Manufacturer Certificates: Signed by EIFS manufacturer, certifying the following:

1. EIFS substrate is acceptable to EIFS manufacturer.

2. Accessory products installed with EIFS, including joint sealants, flashing, water resistant barriers, trim whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. As a minimum product or system used must meet the same criteria as the latest published data of the manufacturers for the following categories:

1. Resistance to the elements.

2. Resistance to wind loads as noted on Structural Drawings.

3. Resistance to impact.

4. Resistance to chemicals.

5. Adhesive strength.

6. Flexural strength.

7. Fire test data.

C. System shall be capable of resisting wind loads per ASCE-7 or New York City Building Code, whichever is greater.

D. 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 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original unopened containers with legible manufacturer's identification.

B. Store products in a cool dry place out of direct sunlight, protected from the elements and from damage.

1. Store at a temperature of not less than 40 deg. F.

1.6 JOB CONDITIONS

A. Environmental Requirements

1. Apply system in ambient temperatures of at least 40 deg., and on unfrozen surfaces.

2. Maintain a minimum ambient temperature of 40 deg. F. for at least 24 hrs. after the system installation.

B. Protection

1. Protect surrounding areas and surfaces to preclude damage during application of the system.

2. Protect finished work when stopping for the day or when completing an area so that water will not penetrate behind the system, or damage finished work.

C. Coordination

1. The work of this Section requires close coordination between related Sections.

2. All joints requiring sealant shall be sealed immediately after the installation of the system.

1.7 WARRANTY

A. Provide manufacturer's ten (10) year material and installation warranty. Warranty shall include the entire wall system including the sealant. Warranty shall cover the watertight characteristic of the wall system as well as cracking, delamination, fading and other defects.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide DryVit Systems, Inc.; Outsulation Plus MD System or comparable product by one of the following:

1. Parex

2. Senergy

3. Sto Corporation

4. Or approved equal.

2.2 MATERIALS

A. Air Barrier Components

1. Backstop: A 100% acrylic product, field mixed with Portland cement in a 1:1 ratio by weight.

2. Grid Tape: An open weave fiberglass tape with pressure sensitive adhesive.

3. Flashing Tape: A high-density polyethylene film backed with rubberized asphalt.

4. Flashing Tape Surface Conditioner: A water-based surface conditioner and adhesion promoter for the Flashing Tape.

B. Adhesive Material: Fiber reinforced, acrylic modified product, field mixed with Portland cement in a 1:1 ratio by weight.

C. Insulation Board: Provide insulation board of thickness indicated on drawings but no less than an 1".

D. Insulation Board Closure Blocks

1. Aged, expanded polystyrene with a nominal density of 1.0 pcf but not less than 0.95 pcf.

2. Minimum 6" wide.

E. Starter Strip: A 2" x 6" x 4" piece of aged-expanded polystyrene configured to receive the Track and Vent Track. It is required at the base of all walls, at base of horizontal compartments, and heads of windows and other openings.

F. Vent Assembly: A 2" x 6" x 10" piece of aged-expanded polystyrene, which is configured to contain a formed aggregate matrix material and receive the Vent Track. It is required at the base of walls and the base of horizontal compartments and is capable of draining water.

G. Vent Track: A 'J' shaped track complying with ASTM D 1784 and ASTM C 1063 containing a slot for venting and drainage and located above the Vent Assembly, along with base of walls and horizontal compartments.

H. Track: A 'J' shaped track complying with ASTM D 1784 and ASTM C 1063 located above the Starter Strip.

I. Adhesive: A moisture cure, urethane-based adhesive used to attach the Track and Vent Track to the Air Barrier.

J. Reinforcing Mesh: Balanced, open weave glass fiber fabric treated for compatibility with other system components.

1. Standard Reinforcing Mesh: Minimum 6 oz./yd^2 weight, with an EIMA Impact Classification of Level 2.

2. Heavy Duty Mesh: Minimum 20 oz./yd^2 weight, with an EIMA Impact Classification of Level 4.

a. Use Panzer mesh in conjunction with Standard Plus mesh for all EIFS within 8'-0" of finish grade.

3. Corner Mesh: Minimum 7.2 oz./yd^2 weight, with a minimum tensile strength of 274 lbs./in. of width.

4. Detail Mesh: Minimum 4.3 oz./yd^2 weight, with a minimum tensile strength of 150 lbs./in of width.

K. Base Coat: Manufacturer’s standard acrylic-based product, field mixed with Portland cement in a 2:1 ratio by weight.

L. Finish: As selected by Commissioner.

M. At all penetrations, including windows, provide open cell polyurethane foam with water stabilized polymer modified acrylic.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSPECTION

A. Inspect concrete substrates prior to start of application for:

1. Contamination: Algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew, or other foreign substances.

2. Surface absorption and chalkiness.

3. Cracks: Measure crack width and record location of cracks.

4. Damage and deterioration such as voids, honeycombs, and spalls.

5. Moisture Content and Moisture Damage: Use a moisture meter to determine if the surface is dry enough to receive the products and record any areas of moisture damage.

6. Compliance with Specification Tolerances: Record areas that are out of tolerance (greater than ¼ inch in 8 feet deviation in plane).

3.3 SURFACE PREPARATION

A. Restore cracks, spalls or damage in concrete and concrete masonry surfaces and level concrete and masonry surfaces to comply with required tolerances.

B. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

C. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.

D. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

E. Verify suitability of substrate by performing bond and moisture tests recommended by EIFS manufacturer.

3.4 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C1397, ASTM E2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate.

3.5 SUBSTRATE PROTECTION APPLICATION

A. Flexible-Membrane Flashing: Apply and lap to shed water; seal at openings, penetrations, and terminations. Prime substrates with flashing primer if required and install flashing.

3.6 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at window sills, and elsewhere as indicated. Coordinate with installation of insulation.

B. Drip Screed/Track: Use at bottom edges of EIFS unless otherwise indicated.

C. Window Sill Flashing: Use at windows unless otherwise indicated.

D. Expansion Joint: Use where indicated on Drawings.

E. Casing Bead: Use at other locations.

F. Parapet Cap Flashing: Use where indicated on Drawings.

3.7 INSULATION INSTALLATION

A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C1397 and the following:

B. Backwrapping: Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2-1/2 inches on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure. Alternatively, pre-wrap terminating edges of insulation board.

C. Concrete Masonry Units: Apply adhesive by ribbon-and-dab method.

D. Press and slide insulation into place. Apply pressure over entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.

E. Allow adhered insulation to remain undisturbed for not less than 24 hours, before beginning rasping and sanding insulation or before applying base coat and reinforcing mesh.

1. Concrete Unit Masonry: 1 inch.

F. Apply insulation over dry substrates in courses, with long edges of boards oriented horizontally.

1. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.

2. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints, so no piece of insulation is less than 12" wide or 6" high. Offset joints not less than 6" from corners of window and door openings and not less than 4" from aesthetic reveals.

G. Interlock ends at internal and external corners.

H. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16" occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.

I. Cut insulation to fit openings with details in, corners, and projections precisely and to produce edges and shapes comply indicated.

1. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32" (from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16". Prevent airborne dispersal and immediately collect insulation raspings or sandings.

2. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4".

J. Install foam buildouts and attach to structural substrate by adhesive.

K. Interrupt insulation for expansion joints where indicated.

L. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.

M. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.

N. Before installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2" over front and back face unless otherwise indicated on Drawings.

O. Treat exposed edges of insulation as follows:

1. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.

2. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.

P. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.

Q. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS lamina.

R. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. At expansion joints in substrates behind EIFS.

2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.

3. Where wall height or building shape changes.

4. Where EIFS manufacturer requires joints in long continuous elevations.

3.8 BASE-COAT APPLICATION

A. Water-Resistant Base Coat: Apply full-thickness coverage to exposed insulation and to exposed surfaces of sloped shapes, window sills, parapets, foam buildouts and to other surfaces indicated on Drawings.

B. Base Coat: Apply full coverage to exposed insulation and foam buildouts with not less than 1/16" dry coat thickness.

C. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2" or otherwise treated at joints to comply with ASTM C1397. Do not lap reinforcing mesh within 8" of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

D. Double-Layer Reinforcing-Mesh Application (from grade to 8'-0" a.f.f. where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2" or otherwise treated at joints to comply with ASTM C1397 in same manner as first application. Do not apply until first base coat has cured.

E. Additional Reinforcing Mesh: Apply strip-reinforcing mesh around openings, extending 4" beyond perimeter. Apply additional 9-by-12-inch strip-reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch wide, strip-reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4" on each side of corners.

1. At aesthetic reveals, apply strip-reinforcing mesh not less than 8" wide.

2. Embed strip-reinforcing mesh in base coat before applying first layer of reinforcing mesh.

F. Double Base-Coat Application: Apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

3.9 FINISH-COAT APPLICATION

A. Primer: Apply over dry base coat.

B. Finish Coat: Apply full-thickness coverage over dry primed base coat, maintaining a wet edge at all times for uniform appearance, to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

C. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

END OF SECTION 07 24 00

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 permeable/air barrier applied over sheathing board and cold-formed metal framing behind exterior rainscreen cladding.

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 04 20 00 "Unit Masonry"

1.3 REFERENCES

A. ASTM C 920: Standard Specification for Elastomeric Joint Sealants.

B. ASTM C 1193: Standard Guide for Use of Joint Sealants.

C. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E 96: Water Vapor Transmission of Materials.

E. ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

F. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.

G. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.

H. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

I. NFPA: Class A 0 -25 Flame Spread Index 0 -450 Smoke Developed Index.

J. ICC-ES AC-38: Acceptance Criteria for Water-Resistive Barriers.

K. ICC-ES AC188: Acceptance Criteria for Roof Underlayments.

L. ICC-ES AC48: Acceptance Criteria for Self-Adhered Roof Underlayments for Use as Ice Barriers.

M. AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.

N. AAMA 711-05: Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

O. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Submit shop drawings showing locations and extent of vapor permeable air 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 vapor permeable air barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it.

G. Submit samples, 3 by 4 inch minimum size, of each vapor permeable air barrier material required for Project.

H. Test results of air permeability testing of primary air barrier material (ASTM E 2178).

I. Test results of assembly in accordance with ASTM E 2357.

1.5 PERFORMANCE REQUIREMENTS

A. Provide vapor permeable air barrier constructed to perform as a continuous vapor permeable air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall 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 0.01 cfm/sf @ 1.57 psf.

C. NFPA 285 Compliance

D. Connections to Adjacent Materials: Provide connections to adjacent materials at the following locations and show same on shop drawings:

1. Walls, windows, curtain walls, storefronts, louvers or doors.

2. Different wall assemblies, and fixed openings within those assemblies.

3. Wall and roof connections.

4. Walls, floor and roof across construction, control and expansion joints.

5. Walls, floors and roof to utility, pipe and duct penetrations.

6. Seismic and expansion joints.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Single-Source Responsibility: Obtain vapor permeable air barrier materials from a single manufacturer regularly engaged in manufacturing the product.

C. Field-Constructed Mock-Ups: Prior to installation of vapor permeable air barrier, apply vapor permeable air 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 (one of CMU 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 E 1105 for air and water infiltration.

E. Manufacturer shall be on-site at least once a week to observe installation and provide written report within 3 days.

F. Manufacturer shall confirm all termination details and compatibility with materials being terminated to.

1.7 WARRANTY

A. System Warranty: Provide the manufacturer’s five (5) year system warranty, including the primary vapor permeable air 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 33MR Vapor Permeable Liquid Membrane or comparable product by one of the following:

a. GCP Applied Technologies.
b. Carlisle.
c. Or approved equal.

B. Transition Membrane: As standard with the manufacturer.

C. UV Resistant Self-Adhering Membrane: As standard with the manufacturer.

D. Window and Door Opening Flashing: As standard with the manufacturer.

E. Thru-Wall Flashing: As standard with the manufacturer.

F. Primer for Blueskin: As standard with the manufacturer.

G. Air Barrier Sealant: As standard with the manufacturer.

H. Substrate Cleaner: As standard with the manufacturer.

I. Filter Fabric: As selected by Commissioner; black filter fabric to cover vapor barrier in areas where exposed color is not black.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 SURFACE PREPARATION

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.

B. Fill cracks in masonry and concrete up to 1/4" wide with a trowel application of liquid membrane or air barrier sealant and allow to cure overnight prior to application of the liquid membrane to the surface, or alternatively, seal the cracks with a strip of transition membrane applied to the substrate. Seal cracks wider than 1/4" with transition membrane adhered to the substrate lapped a minimum of 3" on both sides of the crack.

C. Tie in surfaces with beams, columns, etc. using strips of transition membrane lapped a minimum of 3" on both substrates. Make mechanical attachment to all window and door frames, or a provide properly designed sealant joint.

3.3 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.

3.4 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 shall form continuous flashing and shall 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.

3.5 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 shall 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. Penetrations: Seal all penetrations with termination mastic liquid membrane, sealant, flashing or other procedures in accordance with manufacturer’s instructions.

3.6 PROTECTING AND CLEANING

A. Protect vapor permeable air 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 vapor permeable air 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 90 days after installation, apply temporary UV protection.

3.7 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 the Commissioner.

END OF SECTION 07 27 00

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 steel façade panels with factory-applied finish.

2. Sub-girts, trim, and accessories required for complete installation.

3. 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".

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 solid metal as indicated on drawings.

2.2 MATERIALS

A. Panels: ASTM B209, Type 5005.

B. Flat Panels: 0.125” thick ASTM A36

1. ASTM A36, hot dip galvanized per Section 055000/

2. Concealed fasteners.

3. Bending outside radius: 3/32”

4. Finish: clear coating: 3-part PVDF Coating, Base of Design: Kynar 500, Valspar, Hylar or approved equal

5. 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. 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.

D. Sealant: One part silicone conforming to the requirements of Section 079200, "Joint Sealants."

E. 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.

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. ¼” fasteners recommended by system manufacturer.

8. ¼” 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 requirements governing execution.

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. Preparation of substrate to receive roofing materials.
2. Roof membrane application.
3. Roof flashing application.
4. Incorporation of sheet metal flashing components and roofing accessories into the roof system.
5. Field quality control.

B. Related Sections

1. Section 07 62 00 “Sheet Metal Flashing and Trim”
2. Section 22 14 23 “Storm Drainage Piping Specialties”

1.3 REFERENCE STANDARDS

A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

1. ASTM American Society for Testing and Materials, Philadelphia, PA (215) 299-5585
2. FM Factory Mutual Engineering and Research, Norwood, MA (617) 762-4300
3. ICBO International Conference of Building Officials, Whittier, CA (562) 699-0541
4. NRCA National Roofing Contractors Association, Rosemont, IL (847) 299-9070
5. OSHA Occupational Safety and Health Administration, Washington, DC (202) 523-1452
6. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA (703) 803-2980
7. UL Underwriters Laboratories, Northbrook, IL (708) 272-8800

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures."

1.5 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, sections, details, and attachments to work of other trades, including the following:

1. Layout and thickness of insulation.

2. Base flashings and membrane terminations.

3. Flashing details at penetrations.

C. Submit a letter signed by the manufacturer and Contractor acknowledging that the submitted roofing system complies with ASCE-7, for wind speed requirements based on height of structure and geographic location of project.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements."

B. Products: Primary roofing products, including each type of sheet, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 3 years. Secondary or accessory products shall be acceptable to the manufacturer of the primary roofing products.

C. Installer Qualifications: An entity meeting the requirements of DDC General Conditions Section 014000 1.7/C/3.

D. Agency Approvals: The proposed roof system shall conform to the following requirements.

1. Underwriters Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.

E. Scope of Work: The work to be performed under this specification shall include the following: Attend necessary job meetings and furnish competent and full-time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.

F. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides properly instructed company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful.

G. Reflectance: Comply with LL94 (2019) solar reflectance requirements. Roof coverings on roofs or setbacks with slope equal to or less than two units vertical in 12 units horizontal (17 percent) shall have a minimum initial solar reflectance of 0.7 in accordance with ASTM C 1549 or ASTM E 1918, and a minimum thermal emittance of 0.75 as determined in accordance with ASTM C 1371 or ASTM E 408.

1.7 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Materials: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

1.8 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

B. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

2. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

3. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

4. Site Condition: Complete, to the Commissioner’s satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.9 GUARANTEE/WARRANTY

A. Roof Membrane Warranty: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the City of New York with the Manufacturer's twenty (20) year labor and materials membrane guarantee. The guarantee shall be a term type, without deductibles or limitations on coverage amount (No Dollar Limit).

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM ASSEMBLY/PRODUCTS

A. Temporary Roof Ply Sheet. A fiberglass reinforced specially oxidized asphalt coated sheet having a minimum weight of 70 lb./square.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Irex 40 or comparable product by one of the following:

a. Soprema
b. Johns Manville
c. Or approved equal.

B. Rigid Roof Insulation. Roof insulation shall be UL and/or FM approved. The insulation manufacturer for intended use and for use shall approve insulation in writing with the specified roof assembly. Maintain a maximum panel size of 4 feet by 4 feet where insulation is specified to be installed in insulation adhesive.

1. Polyisocyanurate. A closed cell, rigid polyisocyanurate foam core material, in full compliance with ASTM C1289, Type II. Panels shall be 3.5 in thickness.

a. Provide insulation to achieve a minimum R-value of 59.8.

2. Gypsum Sheathing Recovery Panel. One-Quarter (1/4) inch.

a. Product: Subject to compliance with requirements, provide one of the following:
1). Georgia-Pacific; DensDeck Prime
2). US Gypsum; Securock
3). National Gypsum; DEXcell Glass Mat Roof Board
4). Or approved equal.

2.2 DESCRIPTION OF SYSTEMS

A. Roofing Membrane Assembly. A roof membrane assembly consisting of two plies of a prefabricated, fiberglass reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, secured to a prepared substrate. Both reinforcement mats shall be impregnated and coated each side with a high quality SBS modified bitumen blend. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Paradiene 20/30 FR BW applied in cold adhesive roof system or comparable product by one of the following:

a. Johns Manville
b. Soprema
c. Or approved equal.

2. Modified Bitumen Base Ply

a. Thickness (avg.): 91 mils - 2.3 mm

b. Weight (avg. per 100 ft² of coverage) - 62 lbs – 3.0 kg/m²
c. Low temperature flexibility @ -15º F (-26º C) - PASS (ASTM D5147)
d. Breaking Load (avg.) @ 73º F - 30 lbf/inch (ASTM D5147)
e. Ultimate Elongation (avg.) @ 73º F - 55% (ASTM D5147)
f. Compound Stability (min.) - 250º F (121º C)
g. Approvals - UL Class listed, FM Approved (products shall bear seals of approval)
h. Reinforcement - fiberglass mat
i. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Paradiene 20 or comparable product by one of the following:
   1). Johns Manville
   2). Soprema
   3). Or approved equal.

3. Modified Bitumen Finish Ply

a. Thickness (avg.): 130 mils - 3.3 mm
b. Thickness at selvage (avg.): 98 mils – 2.5 mm
c. Weight (avg. per 100 ft² of coverage) - 80 lbs – 3.9 kg/m²
d. Low temperature flexibility @ -15º F (-26º C) - PASS (ASTM D5147)
e. Breaking Load (avg.) @ 73º F - 30 lbf/inch (ASTM D5147)
f. Ultimate Elongation (avg.) @ 73º F - 55% (ASTM D5147)
g. Compound Stability (min.) - 250º F (121º C)
h. Approvals - UL Class listed, FM Approved (products shall bear seals of approval)
i. Reinforcement - fiberglass mat
j. Surfacing – white acrylic chip
k. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Paradiene 30 FR BW or comparable product by one of the following:
   1). Johns Manville
   2). Soprema
   3). Or approved equal.

4. Stripping Ply - (Same as roof system base ply unless noted)

B. Reinforced Fluid Applied PMMA Flashing System. A multi-component, flexible, polymethylmethacrylate (PMMA) based resin combined with a thixotropic agent for use in combination with fleece fabric to form a monolithic, reinforced flashing membrane.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Parapro 123 catalyzed resin reinforced fluid applied flashing or comparable product by one of the following:

a. Johns Manville
b. Soprema
c. Or approved equal.

2. Catalyst: A reactive agent used to induce curing of polymethylmethacrylate (PMMA) resins.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Pro Catalyst or comparable product by one of the following:
   1). Johns Manville

2). Soprema
3). Or approved equal.

3. Fleece for Membrane and Flashing Reinforcement: A non-woven, 110 g/m², needle-punched polyester fabric reinforcement as supplied by the membrane system manufacturer.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Pro Fleece or comparable product by one of the following:
1). Johns Manville
2). Soprema
3). Or approved equal.

4. Resin for Flashing Applications: A multi-component, flexible, polymethylmethacrylate (PMMA) based resin combined with a thixotropic agent for use in combination with fleece fabric to form a monolithic, reinforced flashing membrane.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Parapro Flashing Resin or comparable product by one of the following:
1). Johns Manville
2). Soprema
3). Or approved equal.

2.3 ROOFING ACCESSORIES

A. Roofing Adhesives

1. Membrane cold adhesive, a blend of special adhesive asphalts and safe, high-flash, quick drying solvents that meets or exceeds ASTM D 4479, TYPE II requirements. Low solvent VOC.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; PA-311M Adhesive or comparable product by one of the following:
1). Johns Manville
2). Soprema
3). Or approved equal.

2. Insulation Adhesive. A single component, moisture cured, polyurethane foam adhesive, dispensed from a portable, pre-pressurized container used to adhere insulation panels to the substrate as well to other insulation panels.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Para-Stick Professional Roofing Adhesive or comparable product by one of the following:
1). Johns Manville
2). Soprema
3). Or approved equal.

B. Bituminous Cutback Materials

1. Primer. A high flash, quick drying, asphalt solvent blend which meets or exceeds ASTM D41 requirements.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; PA-917LS Asphalt Primer or comparable product by one of the following:
   1). Johns Manville
   2). Soprema
   3). Or approved equal.

2. Mastics. An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D4586 Type II requirements.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; PA-1021 Plastic Cement or comparable product by one of the following:
      1). Johns Manville
      2). Soprema
      3). Or approved equal.

C. Caulking/Sealants. A single component, high performance, elastomeric sealant conforming to ASTM D232, ASTM C920, or ASTM C920.

1. Product: Subject to compliance with requirements, provide one of the following:

   a. Tremco; Tremseal
   b. Sonneborn Building Products; Sonolastic NP 1
   c. Gibson-Homans; Black Jack No. 1010
   d. Or approved equal.

D. PMMA Primers

1. PMMA Primer for Concrete/Masonry/Wood/Plywood Substrates: A two component, PMMA based primer for use over concrete, concrete repair materials, masonry substrates and wood/plywood substrates.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Pro Primer T or comparable product by one of the following:
      1). Johns Manville
      2). Soprema
      3). Or approved equal.

2. PMMA Primer for Asphaltic Substrates: A two component, fast-curing, PMMA based primer for use over asphaltic materials.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Pro Primer R or comparable product by one of the following:
      1). Johns Manville
      2). Soprema
      3). Or approved equal.

E. Preparation Paste: A multi-component, fast curing, PMMA based paste used for remediation of depressions in substrate surfaces or other irregularities.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Pro Paste Resin or comparable product by one of the following:

    1). Johns Manville
    2). Soprema
    3). Or approved equal.

F. Walktread. A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.

1. Thickness: 0.217 inch

2. Weight: 1.8 lbs/ft²

3. Width: 30 inches

4. Basis-of-Design Product: Subject to compliance with requirements, provide Siplast; Paratread Roof Protection Material or comparable product by one of the following:

    1). Johns Manville
    2). Soprema
    3). Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 SUBSTRATE PREPARATION

A. Primer. Prime entire deck area with specified primer at a rate of 100 square feet per gallon.

B. Temporary Roof Application. Cold apply the ply sheets directly to the prepared surface lapping sides and ends a minimum of three (3) inches. Apply the sheets free of wrinkles, creases or fishmouths and exert sufficient pressure on the roll during application to ensure the prevention of air pockets. Seal each penetration and termination using fiberglass tape and the specified plastic cement to ensure that the temporary roof configuration is completely water-tight.

C. Insulation. Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions. Where insulation is installed in two or more layers, stagger joints between layers.

1. Insulation - Multiple Layer. Install insulation panels in an application of the specified insulation adhesive in strict accordance with the requirements of the insulation adhesive manufacturer.

    a. Insulation panels installed in adhesive shall have a maximum panel size of 4 feet by 4 feet.

3.3 ROOF MEMBRANE INSTALLATION

A. Membrane Application. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.

B. Aesthetic Considerations. A consistent, even and clean overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, metallic powder, etc.), and exercise care in ensuring that the finished application is acceptable to the Commissioner.

C. Priming. Prime metal flanges (all jacks, edge metal, lead drain flashings, etc.) and concrete and masonry surfaces with a uniform coating of ASTM D41 asphalt primer.

D. Bitumen Consistency. Cutting or alterations of bitumen, primer, and sealants will not be permitted.

E. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fish-mouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Stagger the lap seams between the base ply layer and the finish ply layer. Stagger the courses to ensure this.

1. Apply all layers of roofing perpendicular to the slope of the deck.

2. Fully bond the base ply to the prepared substrate, utilizing minimum 3" side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps a minimum of 3".

3. Fully bond the finish ply to the base ply, utilizing minimum 3" side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the finish ply a minimum 3". Stagger side laps of the finish ply a minimum 12" from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3" from end laps in the underlying base ply.

4. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds 1/2" per foot. The manufacturer shall provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.

F. Granule Embedment. Broadcast mineral granules over all bitumen overruns on the finish ply surface, to ensure a monolithic surface color.

G. Reinforced Fluid Applied PMMA Flashing Application

1. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.

2. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.

3. Apply an even, generous base coat of flashing resin using a roller at the rate of 19 kg/sq to prepared surfaces requiring flashing coverage. Work the fleece into the wet, catalyzed resin using a brush or roller to fully embed the fleece in the resin and remove trapped air. Lap fleece layers a minimum of 2 inches and apply an additional coat of catalyzed resin between layers of overlapping fleece. Again using a roller, apply an even top coat of catalyzed resin at the rate of 12 kg/sq immediately following embedment of the fleece, ensuring full saturation of the fleece. Ensure that the flashing resin is applied

to extend a 0.25 inch beyond the fleece. Remove the tape before the catalyzed resin sets. Make allowances for saturation of roller covers and application equipment.

4. Should work be interrupted for more than 12 hours or the surface of the catalyzed resin becomes dirty or contaminated by the elements, wipe the surface to be lapped with new flashing resin using the specified cleaner/solvent. Allow the surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

H. Water Cut-Off. At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.4 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. The following is a list of verbal descriptions for correct installation of components integrated into the roof membrane assembly. In all cases, unless otherwise approved, incorporate flanged components into the system between the application of the base ply and the finish ply. The flange must be primed with a uniform coating of approved ASTM D41 asphalt primer and allowed to dry thoroughly; all flanges must be set in approved mastic.

1. Edge Metal. Completely prime metal flanges and allow to dry prior to installation. Turn the base ply down 2 inches past the roof edge and over the nailer. After the base ply and continuous cleat (if applicable) have been installed, set the flange in mastic and stagger nail every 3 inches on center. Strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the gravel-stop rise of the edge metal.

2. Lead Pipe Flashings. Completely prime the lead flanges and allow to dry prior to installation. After the base ply has been applied, set the flange in mastic and strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-sleeve juncture of the pipe flashing.

3. Lead Drain Flashings. Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of 4 inches. Terminate the finish ply to extend beneath the clamping ring seal. Install the clamping ring with all clamps, bolts etc., in place.

4. Metal Pipe Flashings. Completely prime the metal pipe flanges and allow to dry prior to installation. After the base ply has been applied, set the flanges in mastic and strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-sleeve juncture of the pipe flashing. Install a watertight umbrella to the penetration, completely covering the opening of the pipe flashing.

5. Walktread. Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Apply the cement. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.

6. Sealant. Caulk all exposed finish ply edges at gravel stops, waste stacks, pitch pans, vent stacks, etc., with a smooth continuous bead of compatible sealant.

3.5 VERIFICATION

A. Flood Test: Flood test each roofing area for leaks, according to recommendations in ASTM D5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

B. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.

C. Flood each area for 24 hours.

D. Perform infrared thermography immediately after flood testing to identify leaks which have saturated the roof insulation, but have not telegraphed through into the ceiling below.

E. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installation are watertight.

F. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition. Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.

B. Notification of Completion. Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Inspection

1. Post-Installation Meeting. Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

2. Drain Verification. At final inspection of all work, verify that all drains, scuppers, etc., are functioning properly. Ensure that roof drains have adequate strainers.

D. Issuance of the Guarantee. Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

END OF SECTION 07 52 00

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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 through-wall flashing.
3. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.
4. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
5. Separation of contacting surfaces of dissimilar metals.

B. Related Sections

1. Section 07 52 13 "Atactic-Polypropylene-Modified Bituminous Membrane Roofing"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

1.4 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.

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, or Washington Steel Corp. or approved equal. Thickness of stainless steel shall be 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 shall be eighty (80) percent tin and twenty (20) percent lead.

5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.

B. 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 requirements governing execution.

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: 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. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall 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 not more than eight (8) feet from corners. 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. Cap flashing shall be increased longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Cap flashing shall lap 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 slat 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-Wall Flashings: Provide through-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.

END OF SECTION 07 62 00

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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 copings.
2. Roof expansion joint.
3. Column flashing collar.
4. Heat and smoke vent.

B. Related Sections

1. Section 07 52 13 "Atactic-Polypropylene-Modified Bituminous Membrane Roofing "
2. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal flashing.

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. Firestone Tapered Coping (basis of design)

2. Hickman

3. Cheney

4. Johns Manville

5. Or approved equal.

2.2 COLUMN FLASHING COLLAR

A. Provide stainless steel (type 304), 26 gauge prefabricated collar assembly.

B. Basis-of-Design Product: Subject to compliance with requirements, provide SBC Industries; Square Tube Flashing Model SQT/D or comparable product by one of the following:

1. Selkirk

2. Grainger

3. Or approved equal.

2.3 ROOF EXPANSION JOINTS

A. Provide neoprene and metal insulated expansion joint assemblies made of 1/16" aluminum (0.063”) flanges and insulated with 1/2" thick foam insulation. Provide prefabricated units for corners and intersections and provide manufacturer's standard splicing strips and adhesives for installation and splicing of units.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Metal-Era; Permatite Roof to Wall Expansion Joint or comparable product by one of the following:

1. Johns Manville

2. C/S Group

3. Or approved equal.

2.4 HEAT AND SMOKE VENT

A. Automatic Fire (Heat and Smoke) Vent: Provide mill finish aluminum heat and smoke vent units of sizes shown on drawings, with 1" rigid insulation at curbs and door, standard lifting mechanism and automatic heat and smoke sensitive release devices. Provide manufacturer's standard hardware including hold-open device, hinges, latch and operating handles for inside and outside operation.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Bilco; Single Leaf Smoke Vent, 3’-0” x 2’-6”, Type S-50SV or comparable product by one of the following:

1. Babcock-Davis

2. Milcor

3. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

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

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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. 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.

F. 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.

G. Code Compliance: Proposed product must comply with the 2014 New York City Building Code and be approved by New York City Building Department.

H. 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. 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."

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Before proceeding with the work, the installer will apply the primer, fireproofing, and sealer/top coat to a representative substrate section of 10 square feet in size. Areas will be designated by the Commissioner.

2. Materials must be applied in accordance with the project requirements for fire rating thickness, finish texture and color.

3. The application must be witnessed by the Commissioner and is subject to their approval. Once agreed upon in writing, it serves as a guide for the finished work.

4. Do not proceed with remaining work until workmanship, color, and sheen are approved by Commissioner.

5. Refinish mock-up area as required to produce acceptable work.

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 2014 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; Carboline Co., Fireproofing Products Div.

2. Monokote Type MK-6; GCP Applied Technologies.

3. Cafco 300; Isolatek International Corp., Cafco Products.

4. Type F3; Promat Firetemp.

5. Or approved equal.

2.2 EXPOSED SPRAYED FIRE-RESISTIVE MATERIALS (HARDCOAT)

A. General: For exposed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated for material composition and for minimum physical properties of each product listed, measured by standard test methods referenced with each property.

B. High-Density, Cementitious Sprayed Fire-Resistive Material: Factory-mixed, dry, cement aggregate formulation, chloride-free formulation of Portland cement binders, additives, and inorganic aggregates, mixed with water at Project site to form a slurry or mortar for conveyance and application, complying with the following requirements:

1. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination," but with an average density of not less than 40 lb./cu. ft.

2. Bond Strength: 9983 psf per ASTM E 736.

3. Compressive Strength: 548 psi. per ASTM E 761.

4. Corrosion Resistance: No evidence of corrosion per ASTM E 937.

5. Deflection: No cracking, spalling, delamination, or the like per ASTM E 759.

6. Effect of Impact on Bonding: No cracking, spalling, delamination, or the like per ASTM E 760.

7. Air Erosion: Maximum weight loss of 0.0 g/sq. ft. per ASTM E 859.

8. Combustion Characteristics: Passes ASTM E 136.

9. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to New York City Building Department.

   a. Flame Spread: 0.
   b. Smoke Developed: 0.

10. Fungal Resistance: No observed growth on specimens per ASTM G 21.

11. For exterior applications of sprayed fire-resistive material, provide manufacturer's formulation approved for surfaces exposed to the exterior.

C. Cement-Aggregate Cementitious Sprayed Fire-Resistive Material:

1. Basis-of-Design Product: Subject to compliance with requirements, provide GCP Applied Technologies; Monokote Type Z-146 or comparable product by one of the following:

a. Carboline Co., Fireproofing Products Div.
b. Isolatek International Corp., Cafco Products.
c. Or approved equal.

2.3 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 requirements governing execution.

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, provide air circulation and ventilation.

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 21 16 "Gypsum Board Assemblies"

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 119 "Standard Method of Fire Tests of Building Construction and 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. ASTM G 21 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi."

I. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus."

J. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Firestops."

K. 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.

L. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.

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. Literature shall indicate 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 smokeseal assembly required for the Project.

D. Material Safety Data Sheets: Submit MSDS for each firestop product.

E. Qualification Data: For Installer.

1.5 QUALITY STANDARDS

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. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty subcontractor.

D. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by New York City Building Code and as tested by nationally accepted test 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 New York City Building Code, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.

1. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

    a. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
    b. T-Rating: When penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
    c. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.

2. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

    a. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

E. Firestopping products shall be asbestos free and free of any PCBs.

F. Do not use any product containing solvents.

G. Do not use firestop products which after curing, dissolve in water.

H. Do not use firestop products that contain ceramic fibers.

I. 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."

J. 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.

K. 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 alternative means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

L. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of less than or equal to 1 as determined by ASTM G 21.

M. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post-installed." Provide cast-in-place firestop devices prior to concrete placement.

N. Firestop systems do not reestablish the structural integrity of load bearing partitions or assemblies, or support live loads and traffic. Installer shall consult the Commissioner prior to penetrating any load bearing assembly.

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 shall 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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. Smokeseals at top of partitions shall be flexible to allow for partition deflection.

E. Polypropylene Sleeves (PP): For cast-in device options.

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 polyethelene 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.

J. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic or polyprolyene sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

K. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.

L. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.

M. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

N. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

O. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12" of unreinforced annular space.

P. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.

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 shall 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 requirements governing execution.

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. Firestopping shall be provided 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. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.

2. Firestop system installed shall have been tested 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 shall 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 shall 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, depth of insulation top to bottom shall be at least four (4) inches.

C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

A. Special inspecting agency retained 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 repair or replace firestopping so that it complies with 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 joint sealants for the following:

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 cabinetry and millwork 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. All sealants must be chemically and adhesion compatible with adjacent materials, especially weather resistive barriers (of any type).

B. Related Sections

1. Section 07 52 13 "Atactic-Polypropylene-Modified Bituminous Membrane Roofing"
2. Section 07 84 13 "Penetration Firestopping" for firestop sealants.
3. Section 08 80 00 "Glazing"
4. Section 09 21 16 "Gypsum Board Assemblies" for sealant within drywall construction.

1.3 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.

1.4 SUBMITTAL PROCEDURES

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 1.3 herein.

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

1. Store sealant materials and equipment under conditions recommended by their manufacturer.

2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.

3. 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.

1. Submit physical samples for color 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 requirements governing execution.

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. Inform Commissioner of time and place of such installation of control section.

2. Install control section according to specification given herein; it 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 written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. Use only skilled and experienced workers for installation of sealant.

D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Utillize 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 4A 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

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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. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping, as necessary.
3. Preparation of hollow metal doors to receive glazing where required.
4. Furnishing anchors for building into masonry and drywall.
5. Factory prime painting of work of this Section.
6. Steel acoustical door assemblies.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"
2. Section 06 10 00 "Rough Carpentry" for installation of doors and frames.
3. Section 08 71 00 "Door Hardware"
4. Section 08 80 00 "Glazing"
5. Section 09 21 16 "Gypsum Board Assemblies"
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.

F. Submittals for Steel Acoustical Door Assemblies

1. Submit certified test reports indicating that the acoustical performance of the door meets the Sound Transmission Class (STC) performance as indicated in the door schedule. Test data shall be produced from an accredited independent acoustical laboratory which is a member of NVLAP (National Volunteer Laboratory Accreditation Program). Reports shall indicate that the test was performed on the doors and frames of the type to be supplied, in conformance with the requirements of test method ASTM E 90 and ASTM E 413. Earlier test reports will not be acceptable. The test results shall be representative of the performance of the proposed Sound Control Door assembly.

2. Test reports by an independent Acoustical Engineer certifying a Field Sound Transmission Class (FSTC) or Noise Isolation Class (NIC) in conformance with the requirements of test method ASTM E 336, performance of no more than six points below the laboratory STC performance on similar installations.

3. Written guarantee that door is constructed in accordance with the laboratory tested door and free of defects in material and workmanship for a period of 3 years after installation.

4. Fire label as specified in the door schedule.

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, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection, 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 New York City Building Code in 30 minutes of fire exposure.

F. 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.

G. Acoustical Door Single Responsibility: Assign undivided responsibility of the sound retardant door work to a single installer in this type of work. Do not engage an installer unacceptable to the manufacturers of the primary materials to be used. Include the following major items of work in the scope of work for undivided responsibility:

1. Doors and frames.

2. Gasketing and sills.

3. Door hardware.

4. Glass and glazing.

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 A 250-11, 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 galvannealed 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 (Galvannealed) 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: Not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.

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".

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: Minimum eighteen (18) gauge.

2. Face sheets for exterior doors: Minimum sixteen (16) gauge, with hot dipped galvannealed coating conforming to ASTM A 924 and A 653, A-60 coating. Provide zinc alloy coating that is a dull matte surface treated for paint adhesion.

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. Exterior doors must have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Provide openings in the bottom closure of exterior doors to permit the escape of entrapped moisture.

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 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: 3/8" at threshold; 3/4" if no 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.

2.10 STEEL ACOUSTICAL DOOR ASSEMBLIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide IAC Acoustics "Noise-Lock" STC 55 door assembly, or comparable product by one of the following:

1. Krieger Specialty Products
2. Overly Door Company
3. Or approved equal.

B. System Description

1. Design requirements: Acoustical door assemblies to include doors, frames, and door hardware to include gasketing systems, retainers and retainer covers, automatic or fixed door bottoms, cam-lift hinges, thresholds, and sills, required to achieve specified performance requirements.
2. Performance Requirements:
   a. Rated doors must have a Sound Transmission Class (STC) rating of 55.
   b. Installed door assemblies must meet Field Sound Transmission Class (FSTC) values no less than 3 dB points below the specified STC ratings.
   c. Test shall be for proposed door, frame, threshold, seals and hardware. Doors must be fully operational at the time of the test.

C. Materials

1. Steel sheet: One of the following:
   a. Cold-rolled steel sheet conforming to ASTM A 1008, commercial quality.
   b. Hot-rolled steel sheet conforming to ASTM A 569, pickled and oiled, commercial quality.
2. Galvanized steel sheet: ASTM A 653/A 653M, commercial quality, minimum G60 zinc coating.
3. Acoustical material: Manufacturer's standard for required STC rating.
4. Primer: Meeting ASTM B 117 salt spray for 150 hours, and ASTM D 1735 water fog test for organic coatings for 200 hours.

D. Components

1. Steel doors: Fabricate in accordance with Commissioner-approved shop drawings, 1-3/4 inches minimum thickness, and as follows:
   a. Face Sheets (Interior Doors): Steel sheet, minimum 16 gage sheet thickness.
   b. Core
      1). Stiffen face sheets with continuous vertical steel sections.
      2). Fill spaces between stiffeners with acoustical material.
   c. Vertical Edges

1). Join face sheets at vertical edges by continuous welding:
(a). Join door faces by continuous weld on each edge, extending full door height.
(b). Grind, fill, and dress welds to provide smooth flush surface.
2). Form edge profiles both vertical edges of doors with 1/8 inch in 2 inches bevel.
3). Visible seams on vertical edges not permitted.

d. Horizontal Edges
1). Close top and bottom edges of doors with continuous steel channels, 16 gage minimum; spot-weld channels to both door faces.
2). Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
3). Provide additional flush closing channel at top edge of doors; spot-weld channel to both door faces.

e. Hardware Preparation
1). Mortise, reinforce, drill, and tap doors at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
2). Provide reinforcing plates at surface-mounted or non-templated hardware locations. Surface applied hardware are drilled on site by others.

2. Acoustical Panels: Same materials, construction, and finish as doors; sizes as indicated on Commissioner-approved shop drawings.

3. Frames: Fabricate in accordance with Commissioner-approved shop drawings, and as follows:

a. Frames for interior use: Fabricate from steel sheet, minimum 14-gage thickness.
b. Frames for exterior use: Fabricate from galvanized steel sheet, minimum 14-gage thickness.
c. Form frame members straight, and of uniform profile through lengths, as welded units with integral trim, of sizes and profiles indicated.
1). Weld contact edges of joints closed tight.
2). Miter perimeter trim faces and weld continuously.
d. When shipping limitations so dictate, fabricate frames for large openings in sections designed for assembly in the field; install alignment plates or angles, of same material and gage as frame, at each joint.
e. Hardware Preparation
1). Mortise, reinforce, drill, and tap frames at factory for fully templated mortised hardware only, in accordance with Commissioner-approved shop drawings and supplied templates.
2). Provide reinforcing plates at surface-mounted or non-templated hardware locations.
f. Floor Anchors
1). Fabricate of same material as frame material; minimum 14 gage.
2). Weld anchors inside each jamb for floor anchorage.
g. Jamb Anchors
1). Fabricate of same material as frame material; weld anchors inside each jamb for wall anchorage.
2). Provide anchor types for indicated adjacent wall construction:
(a). Frames for installation in masonry walls: Adjustable jamb anchors, 16 gage, T-shape type.
(b). Frames for installation in stud partitions: Continuous 16 gage steel channel to surround stud, welded inside each jamb.

h. Plaster guards: Fabricate from minimum 22 gage steel; weld in place at hardware mortises on frames to be set in plaster, masonry, or concrete openings.
i. Provide welded frames with temporary steel spreader welded to jamb feet for bracing during shipping and handling.

4. Vision Lites

a. Factory-assemble lites in doors indicated to have lites, using glazing materials and assembly methods indicated on approved shop drawings for required STC rating; field assembly not permitted.
b. Fabricate dual-glazed lites permitting individual removal of each glazing pane.

5. Loose Stops

a. Fabricate of minimum 12 gage steel, with factory-drilled and countersunk holes for fasteners.
b. Form stops for mitered corner joints.
c. Supply cadmium-coated or zinc-coated fasteners, size and quantity required for fastener holes.

6. Door Hardware:

a. Supply gasketing systems, retainers, retainer covers, automatic door bottoms, fixed door bottoms, cam-lift hinges, thresholds, and sills as indicated on Commissioner-approved shop drawings, or specified in manufacturer's product data for project conditions, to achieve specified performance requirements.
b. All other door hardware is specified in Section 087100.
c. Hardware Location on Doors and Frames
   1). Hinges:
      (a). Top: 5 inches from head of frame to top of hinge.
      (b). Bottom: 10 inches from finished floor to bottom of hinge.
   2). Unit and integral type locks and latches: 38 inches from finished floor to centerline of knob.
   3). Deadlocks: 48 inches from finished floor to centerline of strike.

E. Sill Condition

1. Where indicated on the drawings, furnish a smooth flush stainless steel or aluminum threshold for the door bottom to seal against when the door is in the closed position. The minimum width of the threshold shall be door thickness plus 4” to allow the threshold to extend a minimum of 1-1/2” beyond the face of the door on both sides of the opening. For openings where carpet extends through the opening, the threshold height shall be 1/8” greater in height than the carpet thickness.

F. Finish: All tool marks and surface imperfections shall be removed and exposed faces of all welded joints shall be dressed smooth. Assemblies shall be treated and shall be coated on all accessible surfaces with a rust-inhibitive primer which meets ASTM B117 salt spray for 150 hours, and ASTM D1735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION OF HOLLOW METAL DOORS AND FRAMES

A. Refer to Section 06 10 00, Rough Carpentry, for installation procedures for all work of this Section.

3.3 INSTALLATION OF STEEL ACOUSTICAL DOOR ASSEMBLIES

A. Install units in accordance with approved shop drawings and manufacturer's printed installation instructions; in addition, install steel components in accordance with HMMA 840.

B. Fill voids between concealed side of frame and adjacent wall construction with lightweight gypsum plaster in accordance with approved shop drawings or manufacturer's printed installation instructions.

C. Finish surfaces having abrasion damage smooth; touch-up with rust inhibitive primer.

D. Install gasketing systems, retainers, retainer covers, automatic door bottoms, fixed door bottoms, cam-lift hinges, thresholds, and sills in accordance with manufacturer's printed instructions.

E. Installation of all other door hardware is specified in Section 087100.

F. Site Tolerances: Do not exceed the following installation tolerances:

1. Squareness: Plus or minus 1/16 inch measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.

2. Alignment: Plus or minus 1/16 inch measured on jambs on a horizontal line parallel to the plane of the wall.

3. Twist: Plus or minus 1/16 inch measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.

4. Plumb: Plus or minus 1/16 inch measured on the jamb at the floor.

G. Adjust and Clean

1. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

2. Final Adjustments: Check and readjust operating finish hardware items and acoustical seals, leaving steel doors and frames undamaged and in complete and proper operation condition. Check for any air, light (and sound) gaps at door jambs, heads and sills, and adjust seals as necessary.

3. Upon completion of the installation, put each operating component through at least 10 operating cycles. Adjust to achieve optimum operation.

H. Field Supervision: Provide factory trained supervision personnel during installation and final adjustment of sound seals. Provide letter of compliance from manufacturer certifying the completion of a successful installation.

I. If required, the City of New York will retain the services of an independent acoustical consultant to conduct an acoustical test at any designated door locations where noise transmission is suspected of being below the set criteria. The test shall consist of a Field Sound Transmission Class (FSTC) or Noise Isolation Class (NIC) test per ASTM E 336. If such results indicate non-conformance with the established FSTC or NIC requirements, it shall be the responsibility of the Contractor and manufacturer to correct, at their expense, such deficiencies by methods that shall be approved by the Acoustical Consultant and Commissioner prior to incorporation. Acoustical tests shall be repeated and corrective measures devised and incorporated until the set criteria and performance standards are met. If the Acoustical Consultant or Commissioner determines that the materials are not as specified herein, all costs for the initial acoustical test as well as the cost of all retesting shall be borne by the Contractor and the Manufacturer.

END OF SECTION 08 11 13

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FSECTION 08 14 16 - FLUSH WOOD 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 solid core flush wood doors.

B. Related Sections

1. Section 06 10 00 "Rough Carpentry" for installation of wood doors.
2. Section 08 11 13 "Hollow Metal Doors and Frames" for hollow metal frames.
3. Section 08 71 00 "Door Hardware"
4. Section 08 80 00 "Glazing"
5. Section 09 90 00 "Painting and Coating" for field painting.

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit door manufacturer’s product data, specifications and installation instructions for each type of wood door.

1. Include details of core and edge construction and trim for openings.
2. Include factory finish specifications.
3. Include certifications to show compliance with specifications.
4. Include certification to show compliance with AWI and WDMA requirements specified herein.

C. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, and requirements for finishing.

1. Include requirements for veneer matching.

D. Samples: Submit factory finishes applied to actual door face materials, approximately 8 by 10 inches for each material and finish. For each wood species and transparent finish, provide samples showing typical range of color and grain to be expected in the finished work.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

C. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated"; latest edition "Premium" grade and WDMA “Extra Heavy Duty” Performance Level.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form, signed by manufacturer, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) in excess of permitted standard noted in Article 2.3 herein, or show telegraphing of core construction in face veneers.

1. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors.

2. Warranty Period for Solid Core Flush Wood Doors: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOLID CORE FLUSH WOOD DOORS

A. Provide AWI PC-5 Premium Grade hot pressed 5-ply solid core particleboard doors, 1-3/4" thick, conforming to standards specified herein. Subject to compliance with requirements, provide products by one of the following: Masonite, VT Industries, Mohawk or approved equal.

1. Core: Formed flat panel consisting of wood particles bonded together with synthetic resins or other added binder, with an average density of 30 to 32 lbs. per cubic foot. Provide material meeting or exceeding the requirements of ANSI A208.1, Grade 1-LD-2 covering mat formed particleboard with face screw holding of 124 lbs., modulus of rupture of minimum 700 psi and modulus of elasticity of not less than 148,000 psi.

2. Core must be capable of satisfying this WDMA TM-7 cycle slam test for 1 million slams for surface mounted hardware. Where the manufacturer's core does not meet this criteria, stiles and rails must measure a minimum of 5-1/2" and must be fabricated of hardwood.

a. Surface mounted hardware must be installed with minimum 1-1/4" screw penetrations using threaded to the head screws; coordinate with Section 08 71 00 “Door Hardware”.

B. Cross Bands: 1/16" thick hardwood extending full width of door and laid with grain at right angles to face veneers. Provide cross bands and faces laminated to the core with Type I MF or PVA glue.

C. Stiles and Rails: Minimum 1-3/8" solid hardwood or structural composite lumber (after trimming) laminated to the core. Stiles and rails must be securely glued to the core with no voids allowed. Stiles and rails must be capable of screw holding of 550 lbs. per WDMA TM-10.

D. Vertical door edge must be capable of screw holding of 550 lbs. per WDMA TM-10; horizontal door edge must be capable of screw holding of 400 lbs. per WDMA TM-10.

E. Doors with transparent finish to have center balanced, slip matched, quarter sliced veneer; species as selected by Commissioner. Veneer to conform to AWI, "AA" grade veneer with 3" wide leaf. Minimum veneer thickness: Not less than 1/50" after sanding.

1. Veneers: Continuous or end matched at transoms.

F. Hinge loading capacity: 500 lbs. per WDMA TM-8.

G. Where glass lites are noted, factory cut openings. Trim openings with solid hardwood moldings of same type of wood as face veneer. At lite openings in 20 minute rated doors, provide manufacturer's 20 minute approved hardwood system.

H. Doors to be field painted: MDO or hardboard face.

2.2 SHOP FINISH

A. Transparent Finish: Finish in the shop with clear satin catalyzed polyurethane finish conforming to AWI System “Catalyzed Polyurethane Transparent”.

B. Opaque Finish: For doors to be field painted, shop prime on all surfaces with one coat of alkyd wood primer applied to a dry film thickness of 1.5 mils.

2.3 FABRICATION

A. Prefit and premachine wood doors at the factory.

B. Comply with the tolerance requirements specified herein. Machine doors for hardware requiring cutting of doors. Comply with final hardware scheduled and door frame shop drawings, and with hardware templates and other essential information required to ensure proper fit of doors and hardware.

C. Factory size doors to door opening so that trimming and fitting are not required in the field.

D. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances unless otherwise indicated.

1. Three degree bevel or bevel to suit frame sizes indicated, with 3/16" prefit in width, +0/-1/32" tolerances. Prefit top of door 1/8" + 1/16"/-0" and undercut as required by floor condition. Undercut must not exceed 1/8" from bottom of door to top of finished floor; where threshold occurs undercut must not exceed 1/8" from bottom of door to top of threshold.

E. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 unless otherwise noted. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

F. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kinds of doors required.

2.4 SOURCE QUALITY CONTROL

A. Once installed, maximum allowable warp, bow, cut or twist in doors: 1/16" as measured by the 1/16 inch feeler gauge and a straight-edge extending from corner to corner of the door face at stiles, top and bottom rails and along both diagonals.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Refer to Section 06 10 00 “Rough Carpentry” for installation of wood doors.

END OF SECTION 08 14 16

SECTION 08 41 23 - FIRE RATED GLASS AND FRAMING SYSTEMS - EXTERIOR

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. Fire rated window and framing systems for installation as full vision fire rated doors, sidelights, windows, and transoms in exterior openings.

B. Related Sections

1. Section 05 50 00 "Metal Fabrications"
2. Section 07 27 00 "Air Barriers"
3. Section 07 62 00 "Sheet Metal Flashing and Trim"
4. Section 07 84 13 "Penetration Firestopping"
5. Section 07 92 00 "Joint Sealants"
6. Section 08 71 00 "Door Hardware"
7. Section 08 80 00 "Glazing"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Installer Qualifications: An experienced installer who has completed work similar in material, design, and extent to that indicated for this Project and whose work has resulted in installations with a record of successful in-service performance.

C. Fire-Rated Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to New York City Building Code, for fire ratings indicated, based on testing according to NFPA 251 and 257.

D. Certification - Fire-Rated Assemblies: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. An approved independent testing laboratory equal to UL must conduct fire test.

E. Listings and Labels - Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies in accordance with limits of manufacturer's listing.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data - Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data and installation instructions.

C. Shop Drawings: Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure. Details are to be drawn at a scale of 6" = 1'-0" and to include adjoining materials and assemblies.

D. Structural Calculations: Provide structural calculations signed and sealed by a Professional Engineer licensed in the State of New York; prepared in compliance with referenced documents and these specifications.

E. Hardware Schedule: list of manufacture supplied hardware and verification of cylinder size complying with Section 08 71 00 “Door Hardware”.

F. Samples: For following products:

1. Two 8-inch by 10-inch samples for glass

2. Two 12-inch long samples of steel frame

3. Verification of sample of selected finish

4. 12-inch long samples of sealants. Install sealant samples between two strips of material representative in color of the adjoining framing system. Provide color and gloss to match Commissioner’s samples.

G. Glazing Schedule: Use same designations indicated on drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

H. Warranties: Submit manufacturer’s warranty.

I. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with specified requirements and New York City Building Code, whichever is more stringent.

1. Separate certification will not be required for glazing materials bearing manufacturer’s permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to New York City Building Code.

J. Qualification Data: For installer and glass testing agency.

1.5 REFERENCES

A. American Architectural Manufacturers Association (AAMA)

1. AAMA 501.1-2005: Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure

2. AAMA 501.2-2003: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

3. AAMA 501.4-2001: Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subject to Seismic and Wind Induced Inter-story Drifts.

4. AAMA 501.5-2005: Test Method for Thermal Cycling of Exterior Walls

5. AAMA 1503-1998: Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

6. AAMA 2603-2002 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

7. AAMA 2604-2005 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

8. AAMA 2605-2005 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):

1. ASTM E119: Methods for Fire Tests of Building Construction and Materials.

2. ASTM E 283: Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen

3. ASTM E 330: Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference Procedure A

4. ASTM E 331: Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

5. ASTM E 783: Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors

6. ASTM E 1105: Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference

C. Builders Hardware Manufacturers Association, Inc.

1. BHMA A156 - American National Standards for door hardware; 2006 (ANSI/BHMA A156).

D. National Fire Protection Association (NFPA):

1. NFPA 80: Standard for Fire Doors and Fire Windows.

2. NFPA 251: Standard Methods of Tests of Fire Endurance of Building Construction and Materials.

3. NFPA 257: Standard on Fire Test for Window and Glass Block Assemblies.

E. Underwriters Laboratories, Inc. (UL):

1. UL 9: Fire Tests of Window Assemblies

2. UL 263: Fire Tests of Building Construction and Materials

F. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

G. American Society of Civil Engineers (ASCE):

1. ASCE-7: Minimum Design Loads for Buildings and Other Structures

H. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 1201 Categories I and II: Safety Standard for Architectural Glazing Materials

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle under provisions specified by manufacturer. For details on storage and product handling, please contact Technical Glass Products and request information on storage and product handling.

B. Deliver materials to specified destination in manufacturer or distributor's packaging undamaged, complete with installation instructions.

C. Store off ground, under cover, protected from weather and construction activities.

1.7 WARRANTY

A. Provide manufacturer’s standard five-year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fire-Resistance-Rated Glazing Units

1. Basis-of-Design Product: Subject to compliance with requirements, provide SAFTI FIRST Fire Rated Glazing Solutions; SuperLite II-XL IGU 120 or comparable product by one of the following:

a. Technical Glass Products
b. Vetrotech Saint-Gobain
c. Or approved equal.

B. Framing System

1. Basis-of-Design Product: Subject to compliance with requirements, provide SAFTI FIRST Fire Rated Glazing Solutions; GPX Architectural Series Framing or comparable product by one of the following:

a. Technical Glass Products
b. Vetrotech Saint-Gobain
c. Or approved equal.

2.2 PERFORMANCE REQUIREMENTS

A. Duration of Fire Rating - System: Capable of providing a fire rating for 120 minutes for windows, unless otherwise indicated.

B. Fire Resistive Rating: Glaze applications in occupancy or area separation walls where glazing exceeds 25% of the wall area, or as otherwise specified with a fire resistive assembly meeting the radiant heat requirements of ASTM E119. Per ASTM E119 and UL 263 requirements temperature on the non-fire side of glazing and framing at conclusion of fire test exposure must be below 250°F above ambient room temperature.

C. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

D. Listings and Labels - Fire Rated Assemblies: Under current follow-up service by Underwriter Laboratory maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer's listing.

E. Fire Rating Requirements

1. Duration-- Window Assembly: Capable of providing a fire rating for 120 minutes.

F. Engineering Services: For the performance requirements listed below requiring structural engineering, provide data, calculations and drawings signed and sealed by a Professional Engineer licensed in the State of New York.

G. Structural Performance

1. Design and size the system to withstand structural forces placed upon it without damage or permanent set when tested in accordance with ASTM E330 using load 1.5 times the design wind loads and of 10 seconds in duration.

2. Design Wind Loads per ASCE-7: +32 psf/ -58 psf.

3. Member Deflection: Limit C.O.G. deflection normal to the plane of the glass to 1/175 of the glass edge length or ¾ inch, whichever is less

4. Accommodate movement between fire-rated windows and adjoining systems

H. Air Infiltration: Provide systems that allow a maximum air leakage through fixed glazed openings of 0.06 cfm/sq. ft. of area when tested per ASTM E 283 at a static air differential of 1.57 lbf/sq ft

I. Water Penetration

1. Under static pressure, provide systems that do not show uncontrolled water leakage when tested according to ASTM E 331 under static pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

2. Under dynamic pressure, provide systems that do not show uncontrolled water leakage when tested according to AAMA 501.1 under static pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

2.3 MATERIALS - GLASS

A. Fire Rated Glazing: ASTM C 1036 and ASTM C 1048; composed of insulated ceramic glazing material.

B. Thickness of Glazing Material: Exterior 1/4" lite to match unrated window glazing and to conform to project design loads and structural performance noted above.

C. Logo: Each piece of fire-rated glazing must be labeled with a permanent logo including name of product, manufacturer, testing laboratory (UL only), fire rating period, safety glazing standards, and date of manufacture.

D. Performance: Glass must be rated to stop fire from either direction and must meet all testing requirements including the required hose-stream test (where fire-rating exceeds 20 minutes).

2.4 MATERIALS - ALUMINUM FRAMES

A. Aluminum Framing System including 120-minute rated windows.

B. Frame Construction: Integral structure and glazing stops from extruded and thermally broken aluminum profiles. Filled internally with cement composite material.

C. Dimensions: See Drawings.

D. Assembly: Frame corners assembled by means of crimped and bonded miter joints.

E. Sealing: Framing system must insulate against effects of fire, smoke, and heat transfer from either side. Perimeter of the framing system to the rough opening must be firmly packed with mineral wool insulation.

F. Fasteners: All fasteners, setting pads, and glazing clips, must be stainless or zinc-plated steel.

G. Glazing Accessories: The glazing material perimeter must be separated from the perimeter framing system with approved flame-retardant intumescent glazing tape. Ceramic setting blocks must be placed between the metal setting pads and the glazing material. Setting pads and blocks provided by manufacturer.

2.5 FABRICATION

A. Furnish frame assemblies pre-welded.

1. When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings.

2. Fit with suitable fasteners.

3. Knock-down frames are not permitted.

B. Field glaze frame assemblies.

C. Fabrication Dimensions: Fabricate to fire-rated field dimensions.

D. Obtain approved shop drawings prior to fabrication.

2.6 FINISHES

A. Factory applied coating with Section 084413 and AAMA 2605 in custom color as selected by the Commissioner.

B. Finish frames after assembly.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Install systems by a specialty subcontractor with appropriate experience qualifications; and in strict accordance with the approved shop drawings and manufacturer's written instructions. Employ experienced mechanics familiar with this type of specialized work.

B. Install fire safing/firestopping at edges of system.

C. Install glazing in strict accordance with respective glazing material manufacturer's specifications. Field cutting or tampering is not permissible.

D. Do not install damaged frames or chipped glazing units.

E. Install plumb and true. Limit out of plumb or true to 1/8 inch in 10’-0” in any dimension.

3.3 FIELD TESTING

A. Air Infiltration (ASTM E783): At 6.24 psf air infiltration allowance for fixed windows to be 0.1 CFM and operable windows 0.30 CFM.

B. Water Resistance Test: Window wall unit must be subjected to water resistance test in accordance with ASTM E 1105. When static pressure of 8 psf has been stabilized, five gallons of water per s.f. must be applied for a period of 15 minutes. No uncontrolled water/leakage at interior face of the window is allowed.

C. Test units as selected by Commissioner at 20%, 50% and 75% installation completion, prior to installation of interior finishes.

D. Testing units not meeting specified requirements, and all like units having similar deficiencies must be corrected at no cost to the City of New York and retested, including (1) additional unit for each failure.

E. Testing must be by an agency acceptable to Commissioner and window manufacturer.

3.4 PROTECTION AND CLEANING

A. Protect 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. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08 41 23

SECTION 08 42 36 - BALANCED DOOR ENTRANCES

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. Balanced aluminum entrance doors and frames, including balanced door hardware.

B. Related Sections

1. Section 07 92 00 "Joint Sealants"
2. Section 08 44 13 "Glazed Aluminum Curtain Walls"
3. Section 08 71 00 "Door Hardware"
4. Section 08 80 00 "Glazing"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Design Criteria: Drawings indicate sizes, member spacings, profiles, and dimensional requirements of work of this Section. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Commissioner's sole judgment, such deviations do not materially detract from the design concept or intended performances.

C. Engineering: Provide manufacturer-certified 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. If required doors exceed limitations of manufacturer’s test data and certifications, provide load calculations signed and sealed by a Professional Engineer licensed in the State of New York proving doors’ performance. Additionally, if Contractor’s proposed system is not from a single source with manufacturer’s certification back up, provide signed and sealed calculations by Professional Engineer licensed in the State of New York. If the manufacturer can show testing, additional engineering will not be required.

D. All windows and doors supplied for the project must meet ASHRAE 90.1 (2013) fenestration requirements per the 2016 NYECC. Fenestration products are to be certified as to performance labels or certificates provided.

1.4 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, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.

C. Shop Drawings: Provide large scale shop drawings for fabrication, installation and erection of all parts of work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show interfaces and relationships to work of other trades.

D. Field Measurements: Take necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.

E. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.

F. Verification Samples: Submit representative samples of each material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.

G. Calculations: If required, provide professionally prepared calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied; refer to Article 2.1 Tests and Performance Requirements.

H. Test Reports: Provide certified test reports for specified tests.

1.5 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. Store under cover and protect from weather damage.

B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.6 WARRANTY

A. All manufactured material furnished and installed herein, including the door operating mechanisms, shall be warrantied against defective material and workmanship for a period of three (3) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TESTS AND PERFORMANCE REQUIREMENTS

A. Manufacturer's Standard Tests: Provide manufacturer's standard test data showing compliance with specified requirements.

B. Testing and performance data applies to exterior assemblies.

C. Test Sequence: Test sequence is optional, except that air infiltration tests must precede water resistance tests.

D. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:

1. Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.

2. Performance: Maximum air leakage not exceeding the following:

a. Fixed Storefront Units: 0.06 cfm per sq. ft. of window area.
b. Door Units: 0.50 cfm per sq. ft. of single doors, 1.00 cfm per sq. ft. for doors hinged in pairs.

E. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.

1. Test Pressure: 20% of positive design wind pressure, but not less than 6.24 PSF.

2. Performance: No leakage as defined in test method at specified test pressure.

F. Uniform Load Deflection Test: Test units in accordance with ASTM E 330, at following static air pressure difference (Design Wind Pressure), or loads prescribed by code for this project site, whichever is greater. Apply pressure first to exterior side (positive) and then interior side (negative).

1. Design Wind Pressure: 30 pounds per square foot minimum.

2. Test Procedure: Procedure A as specified in ASTM E 330.

3. Performance: Deflection in each member measured at locations of greatest deflection must not exceed L/175 at specified Design Wind Pressure.

G. Uniform Load Structural Test: Test units in accordance with ASTM E 330 at following static air pressure difference. Apply high pressure load first on one side and then on other side. At conclusion of test there must be no glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms.

1. Static Air Pressure: Minimum 1.5 times the Design Wind Pressure.

2. Permanent Deformation in Any Member: Not to exceed 0.2% of member span.

H. Condensation Resistant Factor: Not less than 45 for fixed storefront units, and not less than 48 for doors; per AAMA 1502.7.

I. Thermal Movement: Provide storefront systems that allow for expansion and contraction of members throughout an ambient temperature range of 120 deg. F.

J. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of New York City Building Code or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

2.2 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Ellison Bronze; Extruded Aluminum Balanced Door or comparable product by one of the following:

1. Dawson

2. C.R. Laurence Co., Inc.

3. Or approved equal.

2.3 MATERIAL AND ACCESSORIES

A. Material: Extruded aluminum alloy 6063-T6 with a minimum wall thickness of 0.125".

B. Glass: 9/16” laminated glass (1/4” clear outer later with low e coating, 1/16” lamination, 1/4” clear inner layer) complying with ASTM C 1172 and GANA and Section 08 80 00 “Glazing”.

C. Doors

1. Provide extruded aluminum doors, bolted and welded construction for maximum strength.

2. Glass moldings: Permanently fixed on exterior side and snap-trim on interior side.

3. Aluminum doors: Fabricated from aluminum extrusions, 1/8" minimum.

4. Door thickness: To suit condition.

5. Stiles: Medium Radius Stile. Size as shown on drawings.

6. Top Rail: 3" unless otherwise noted.

7. Bottom Rail: As indicated on drawings.

8. Provide aluminum or stainless steel reinforcing materials, welded or mechanically fastened to door body. Plastic or glued-in reinforcements or stiffeners are not acceptable.

9. Fasteners associated with door construction: Stainless steel, concealed type.

10. Glazing: Aluminum extruded snap-on glass stops.

D. Frames

1. Provide aluminum frames fabricated from aluminum extrusions.

2. Frames for door jambs, transoms and headers: 3" face by 6" depth.

3. Frames must be erected without the use of exposed screws where feasible.

4. Portion of hinge jamb must be removable for access to operating hardware.

5. Hinge shaft: Exposed and clad in aluminum, in finish to match doors and frames.

E. Weatherstrip: Manufacturer's standard integral wool pile type, replaceable at stiles and rails. Provide weatherstrip at the following locations:

1. Vertically at meeting stiles on pairs of doors.

2. Concealed at door top and bottom rails.

3. Door stops at both hinge and strike jambs.

4. At both sides of exposed clad hinge shaft.

F. Provide thresholds at all doors unless otherwise detailed, and as follows:

1. Threshold material: Aluminum.

2. Wood screw and rawl plug type fastenings: Approximately 15" on center.

3. Provide 6" wide thresholds set on the finished floor and adequately sealed against water seepage.

G. Balanced Door Hardware:

1. All balanced door hardware, including hydraulic check: Stainless steel, machined and assembled by the door and frame fabricator. Exposed hardware finished as specified below.

2. Stainless steel mechanism and other integral parts must be heavy-duty and must be designed to allow variation in adjustments to meet this particular job with respect to door size, door weight and varying or internal building pressures.

3. Provide balanced hardware including the following items:

a. Stainless steel hydraulic check mechanism with integral closer spring, swing speed and latch speed adjustments, concealed in the head frame. The hydraulic check unit must be removable without requiring the removal of the door, head frame or any other hardware. Closer arms are unacceptable.
b. At each door, provide a heavy-duty steel tube hinge shaft with minimum 1-3/4" diameter and 3/16" minimum wall thickness. Provide hinge shaft complete with spring closing mechanism. The spring closer must be adjustable at the floor to meet varying wind or building conditions. Provide cast solid stainless steel top and bottom arms, welded to hinge shaft. Two piece arms, aluminum arms, or steel painted arms will not be acceptable.
c. Include a spring-cushioned door roller bumper located in the guide channel. The operating mechanism in the head includes ball bearing pivots, stainless steel hydraulic check and stainless steel door guide channel with minimum dimensions of 2-3/8" by 3/4" thick and a minimum wall thickness of 9/16".
d. Provide means which make possible field adjustment for proper perimeter clearance of each door leaf in relation to its finished framework to accommodate on-site conditions.
e. Provide a semi-automatic hold open device located in the bottom rail of each door.
f. All doors are designated as accessible entrances, and must have a maximum of 8 pounds spring tension adjustment at pull handle. The hydraulic check must 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" from the latch, measured to the leading edge of the door. Provide doors with ADA access, assisted opening on demand.
g. Finish: Blackened Steel.
h. Hardware: Refer to Hardware Schedule in Section 087100 Door Hardware.

2.4 ALUMINUM FINISH

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. Custom color and gloss as selected by the Commissioner.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Install materials in strict accordance with installation data provided by factory and these specifications.

3.3 ADJUST AND CLEAN

A. Adjust doors after glazing is complete and readjust when necessary prior to Substantial Completion.

B. Clean metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt and other substances.

END OF SECTION 08 42 36

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"

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 must 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 2014 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 must 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: Provide glazed aluminum curtain walls with certified and labeled energy performance ratings in accordance with NFRC.

1. Thermal Transmittance (U-factor): For fixed glazing and framing areas, provide a 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: For fixed glazing and framing areas, provide 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: For fixed glazing and framing areas, provide 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; HPWall 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 an accessories compatible with adjacent materials.

1. Use self locking devices where fasteners are subject to loosening o 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 mach 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. Provide glass of the types and minimum thickness, as shown on the drawings and specified herein, and in addition, meeting the requirements of the following paragraphs.

B. Obtain all manufactured glass products from single manufacturer. Obtain all fabricated glass products and coated products from single manufacturer. Deliver all glass to the site bearing the manufacturer's label, complete with glazing instructions where applicable.

C. Insulating glass units: 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 must 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 must 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. Provide lites comprising insulating glass units that are 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. Provide glass conforming to the requirements of ASTM C 1036. Heat strengthened and tempered glass must conform to the requirements of ASTM C 1048. Tempered glass must 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. 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. 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.

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. Install insulating glass units in such manner as to adequately drain the glazing rabbet in a manner, as approved in writing, by the insulating unit glass manufacturer.

K. Include 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. Limit glass deflection at full design load to the lesser of L/100 or 3/4". In event specified glass cannot meet these requirements, submit calculations establishing anticipated deflections and reduction in glass bite as a consequence of deflections, along with the drawings. Include in submittal 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. Provide neoprene gaskets/weatherstripping, except where used in contact with a silicone sealant. In contact with silicone sealants, provide preformed heat cured silicone rubber gaskets and spacers, 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 must

have continuous mechanical engagement to framing members; adhesive attachment is not acceptable. Provide continuous weatherstrips and gaskets, with vulcanized/ molded corners where possible.

B. Sponge gaskets/weatherstripping/spacers: 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 conforming to ASTM C 509-79 (for neoprene). Provide sponge gaskets compressed 20% to 35% in the final installed position.

C. Dense gaskets/weatherstripping: 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. Exercise care to ensure against "Three Surface Adhesion." Provide bond breakers where necessary.

E. 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 must 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 must 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 must 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: 26 ga. stainless steel.

E. Flashing required to join the system to adjacent construction: 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 2014 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 2014 New York City Building Code. Provide hourly rating as required by 2014 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 must 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 requirements governing execution.

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.

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SECTION 08 71 00 – DOOR 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 SUMMARY

A. The required hardware items for doors are indicated in hardware sets shown herein. Should any opening be omitted, hardware shall be provided as specified for other doors of similar locations, function, quality and design.

1.3 RELATED SECTIONS

A. Section 08 11 13: Metal Doors and Frames.

B. Section 08 14 16: Wood Doors and Frames.

C. Section 08 42 36: Balanced Door Entrances

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures.

B. Product Data: Submit two (2) copies of the manufacturer’s data for each item of hardware. Include whatever information may be necessary to show compliance with requirements.

C. Hardware Schedule: Submit three (3) copies of the hardware schedule. Follow Door and Hardware Institute (DHI) guidelines for scheduling. At the end of the schedule list each door number with appropriate heading number and hardware set number. Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work. Furnish final schedule after samples, manufacturer's data sheets have been approved.

D. Keying Schedule: A key schedule showing all key numbers and spaces to which each permits entry, shall be provided. Consult with OWNER before submitting final key schedule. After final approval has been received, the schedule along with the key gathering envelopes containing keys for each lock endorsed with lock number and space designation shall be turned over to the OWNERS.

E. Samples: Prior to submittal of the final hardware schedule and prior to delivery of hardware, submit one (1) sample of each exposed hardware unit. Sample will be reviewed by the Commissioner for design, color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Standards: All finish hardware shall conform to one or all the following standards:

1. Testing Laboratories: Underwriters Laboratory (UL) and or Warnock Hersey Fire Laboratories Division: All fire rated doors shall have hardware assemblies approved by one of the listed laboratories.
2. National Fire Protection Association: NFPA 80 and NFPA 101.
3. Builders Hardware Manufacturers Association (BHMA).
4. American National Standards Institute (ANSI).
5. USDOJ's 2010 ADA Standards for Accessible Design and ICC A117.1-2009

1.6 PRODUCT HANDLING

A. Handle, store, distribute, protect and install in accordance with the manufacture's instructions. Deliver packaged material in original containers with seals unbroken and labels intact. Deliver assemblies completely identified and with adequate protection for storage, handling and installation.

B. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control the handling and installation of hardware which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses; both before and after installation.

1.7 PROJECT CONDITIONS

A. Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated and as necessary for proper installation and function. Deliver packaged hardware items to the proper locations for installation.

B. Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.

1.8 WARRANTIES

A. The hardware manufacturers shall provide full replacement warranty as listed below.

Replacement warranty shall not include any labor cost.

1. Surface Closers	25 years
2. Locksets, etc.	2 years
3. Balance of hardware	2 years

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

A. Hand of Door: The drawings show the swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door swing shown.

B. Base Metals: Produce hardware units of the basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness but in no case of lesser quality material.

C. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware, which has been prepared for self- tapping sheet metal screws.

D. Screws: Furnish screws for installation, with each hardware item. Finish exposed screws to match the hardware finish.

E. Concealed Fasteners: Provide concealed fasteners for hardware units which are exposed when the door is closed except to the extent no standard manufacturer's units are available with concealed fasteners. Use thru bolts only where necessary to adequately fasten hardware to the door.

2.2 HINGES

A. All hinges shall be full mortise five knuckle ball bearing type, template, with non-rising loose pins. All outswing doors shall be furnished with non-removable pins (NRP).

B. All hinges for 1-3/4" thick doors shall be 4-1/2" wide in the open position. For other thickness doors, hinges shall be of a width to permit unobstructed swing of the doors.

C. Size and weight of hinges shall conform to the following:

1. Up to 36" ----------4-1/2" heavy weight
2. Over 36” to 44” --------5” heavy weight
3. Over 44” ----------Continuous Hinge

D. Quantity of hinges shall be provided to conform to the following:

1. Doors up to 60" in heights ----------2 hinges
2. Doors 60” to 90" in height ----------3 hinges
3. Doors 90” and over ---------l hinge every 30" in height

E. Where extended hinges are called for, furnish extra wide hinges to suit jamb detail so that door trim, when in the open position, does not extend beyond the width of the frame.

F. All hinges shall be the products of one manufacturer.

2.3 LOCKSETS, LATCHSETS ETC.

A. Unless otherwise noted, all locksets and latchsets shall conform to ANSI A156.13 Series 1000 Grade 1. Furnish wrought steel box strikes and curved lip strikes with proper lip lengths as required.

2.4 KEYS, KEYING, AND CYLINDERS

A. Keys: shall be nickel silver. Furnish a quantity of keys as follows.

1.	Master Keys	5
2.	Change Keys	3 each per cylinder
3.	Control Keys	5
4	Construction Keys	5

B. Keying: All locks shall be construction keyed and great grand master keyed to the Best keying system.

C. Cylinders: All cylinders shall be removable core with visual key control. Furnish brass construction cores. Plastic cores will not be accepted.

2.5 DOOR CLOSING DEVICES

A. All surface closers shall meet ANSI A156.4 Grade 1 requirements, barrier free.

B. All closers shall be installed so that closer bodies are positioned on room side of doors to and from corridors, i.e., in-swing doors shall be regular arm. Out-swing doors shall have a parallel arm. Regular arm shall be used in connecting doors between rooms.

C. Furnish all required brackets, filler plates and any other items required to ensure proper installation and operation.

2.6 DOOR STOPS

A. Basis of Design Product: Subject to compliance with requirements, provide Trimco 1270WV wall mounted door stops or Trimco W1211 floor stop or comparable product by one of the following:
   1. Unison Hardware
   2. Lockwood Industries
   3. Or approved equal.

2.7 FLUSH BOLTS

A. Basis of Design Product: Subject to compliance with requirements, provide Trimco W3917/W3913 series dustproof strikes for all bottom bolts or comparable product by one of the following:
   1. Adams Rite
   2. Baldwin
   3. Or approved equal.

2.8 MANUFACTURERS:

A. Hinges: PBB, Stanley and McKinney, or approved equal.

B. Locksets and Latchsets: Best, Schlage and Corbin or approved equal.

C. Cylinders: Best, Schlage and Corbin or approved equal.

D. Closers: Dorma, LCN and Norton or approved equal.

E. Exit Devices and Power Supplies: Dorma, Von Duprin and Precision, or approved equal

F. Gasketing and Saddles: Legacy, Zero and NGP, or approved equal.

G. Door Stops, Flush Bolts, Push and Pulls: Trimco, Rockwood and Ives or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

A. Approval: As soon as practical after award of Contract and before a hardware schedule is prepared, and before any hardware is ordered or delivered to the project, the Contractor shall submit to the Commissioner for written approval, copies of sample list, listing each of the different items of builder's hardware and catalog cuts of each item.

B. Templates: As soon as the hardware schedule is approved the hardware supplier shall furnish to the various fabricators, required templates for fabrication purposes. Templates shall be made available not more than (1O) days after receipt of the approved hardware schedule.

C. Packaging and Marking: All hardware shall be shipped with proper fastenings for secure application. Each package of hardware shall be legibly marked indicating the part of the work for which it is intended. Markings shall correspond with the item numbers shown on the approved hardware schedule. Keys shall be tagged within each package set and plainly marked on the face of the envelope with the key control number, door designation and all identification as necessary.

D. Delivery: Delivery shall be made to the project site to the attention of the Contractor. Where delivery of special hardware is required at any fabricators plant, the hardware supplier shall make such delivery.

3.3 INSTALLATION

A. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by BHMA, unless otherwise noted or directed by the Commissioner.

B. Install each hardware unit in compliance with the manufacturer's recommendations.

3.4 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer. Replace units that cannot be adjusted.

B. Wherever hardware installation is made more than one (1) month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance make a final check, and adjust all hardware items in such space or area. Adjust door control devices and compensate for final operation of heating and ventilating equipment.

C. Instruct personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.5 HARDWARE SETS

A. The following is a general listing of hardware requirements and is not intended for use as a final hardware schedule. Any items of hardware required by established standards or practices, or proper door operation shall be furnished specifically called out in the following listed groups.

B. Manufacturers listed are “Basis of Design”. Refer to Section 2.8 Manufacturers, for additional manufacturers and approved equals.

HARDWARE SET #1A
Each to have:

	Extended Hinges	Stanley x black
1	Exit Device (exit only)	Adams Rite 3633 (black anodized)
2	Concealed Rod Exit Device	Adams Rite 3933 (black anodized) x 07 lever
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
2	Surface Closer	Dorma 8916 series x 693
1	Wall Stop	Trimco 1270WV x 620 (satin nickel plated, blackened)

HARDWARE SET #2
Each to have:

	Hinges	Stanley (see description) x US26D
1	Storeroom Lock	Best 45H7-D-3R x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer w/stop	Dorma 8916DS-FC x 693
1	set Gasketing	Legacy 5883S-BK-3M-FL @ jambs & head

HARDWARE SET #2A
Each to have:

	Hinges	Stanley (see description) x US26D
1	Storeroom Lock	Best 45H7-D-3R x US26D
1	Temporary Core	Best (to suit) x US26D

1	Permanent Core	Best (to suit) x US26D
1	Overhead Stop	Dorma 912S x US26D
3	Silencers	Trimco 1229A

HARDWARE SET #2B
Each to have:

	Hinges	(by IAC Acoustics Door manufacturer) x US26D
1	Storeroom Lock	Best 45H7-D-3R x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer	Dorma 8916 series x 693
1	Door Stop	Trimco 1270WV x US32D
1	set Gasketing	(by Krieger Door manufacturer) x US26D

HARDWARE SET #2C
Each to have:

	Hinges	Stanley (see description) x US26D
1	Storeroom Lock	Best 45H7-D-3R x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer	Dorma 8916AF89P x 693
1	Door Stop	Trimco 1270WV x US32D
3	Silencers	Trimco 1229A

HARDWARE SET #2D
Each to have:

	Hinges	Stanley (see description) x US26D
1	Storeroom Lock	Best 45H7-D-3R x US26D

1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Door Stop	Trimco 1270WV x US32D
3	Silencers	Trimco 1229A

HARDWARE SET #3
Each to have:

1	Top Track	Coburn C1-12 (size to suit)
1	Pair Track Stop	Coburn 01725
4	Side Mounting Brackets	Coburn 01040
1	Component Pack	Coburn C100-010
1	Soft Closer	Coburn 30367
1	Bottom Door Guide	Coburn 44-319
1	Sliding Door Lock	Accurate 2001ADAP-3 x US26D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D

HARDWARE SET #4
Each to have:

	Hinges	Stanley (see description) x US26D
1	Privacy Set	Best 45H0LT-VIT-3R x US26D
1	Surface Closer	Dorma 8616DA-AF86-FC x 693
1	Door Stop	Trimco 1270WV x US32D
3	Silencers	Trimco 1229A

HARDWARE SET #4A
Each to have:

	Hinges	Stanley (see description) x US26D

1	Privacy Set	Best 45H0LT-VIT-3R x US26D
1	Surface Closer w/stop	Dorma 8616DA-IS-FC x 693
3	Silencers	Trimco 1229A

HARDWARE SET #4B
Each to have:

	Hinges	Stanley (see description) x US26D
1	Privacy Set	Best 45H0LT-VIT-3R x US26D
1	Surface Closer w/stop	Dorma 8616DA-DS-FC x 693
3	Silencers	Trimco 1229A

HARDWARE SET #5
Each to have:

1	Top Track	Coburn C1-12 (size to suit)
1	Component Pack	Coburn C100-010
1	Bottom Door Guide	Coburn C44-371
1	Sliding Door Lock	Accurate 2001ADAP-3 x US26D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D

HARDWARE SET #6
Each to have:

	Extended Hinges	Stanley (see description) x US26D
1	Set Manual Flush Bolts	Trimco W3917 x US26D
1	Dust Proof Strike	Trimco 3910 x US32D
1	Classroom Lock	Best 45H7R3R x US26D
1	Temporary Core	Best (to suit) x US26D

1	Permanent Core	Best (to suit) x US26D
1	Door Stop	Trimco 1270WV x US32D
2	Silencers	Trimco 1229A

HARDWARE SET #7
Each to have:

	Extended Hinges	Stanley (see description) x US26D
1	Exit Device (passage)	Adams Rite 3301 x 07 lever x US32D
1	Surface Closer	Dorma 8916 series x 693
1	Wall Stop	Trimco 1270WV x US32D
2	Silencers	Trimco 1229A

HARDWARE SET #7A
Each to have:

	Extended Hinges	Stanley (see description) x US26D
1	Exit Device (storeroom)	Adams Rite 8801 x 09 function x 07 lever x US32D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer/Stop	Dorma 8916DS x 693
1	set Gasketing	Legacy 5883S-BK-FL @ jambs & head

HARDWARE SET #7B
Each to have:

	Hinges	Stanley (see description) x US26D
1	Exit Device (storeroom)	Adams Rite 8301 x 09 function x 07 lever x US32D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D

1	Surface Closer/Stop	Dorma 8916DS-FMC x 693
1	Closer Mounting Bracket	Legacy 5078SPB
1	set Gasketing	Legacy 5078MB-FL @ jambs & head
1	Door Bottom	Legacy 7553MA-FL

HARDWARE SET #7C
Each to have:

	Hinges	Stanley (see description) x US26D
1	Exit Device (passage)	Adams Rite 3301 x 07 lever x US32D
1	Surface Closer	Dorma 8916 AF86P x 693
1	Wall Stop	Trimco 1270WV x US32D
1	set Gasketing	Legacy 5883S-BK-FL @ jambs & head

HARDWARE SET #7D
Each to have:

	Hinges	(by acoustic door manufacturer) x US26D
1	Exit Device (storeroom)	Adams Rite 3301 x 0 function x 07 lever x US32D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer	Dorma 8916 series x 693
1	Wall Stop	Trimco 1270WV x US32D
1	Door Bottom	by acoustic door manufacturer
1	set Gasketing	(by acoustic door manufacturer) x US26D

HARDWARE SET #7E
Each to have:

1	Continuous Hinge	Legacy 1019HD-MB
1	Exit Device	Dorma 9300 x PTT03 x US32D

1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer/Stop	Dorma 8916SDS-FC x 693
1	set Gasketing	Legacy 5924MB @ jambs & head
1	Door Bottom	Legacy 78918MB
1	Saddle	Legacy (as detailed) x Alum

HARDWARE SET #7F
Each to have:

	Hinges	Stanley (see description) x US26D
1	Exit Device (passage set)	Adams Rite 8301 x 07 lever x US32D
1	Surface Closer/Stop	Dorma 8916DS-FMC x 693
1	Closer Mounting Bracket	Legacy 5078SPB
1	set Gasketing	Legacy 5078MB-FL @ jambs & head
1	Door Bottom	Legacy 7553MA-FL

HARDWARE SET #7G
Each to have:

	Extended Hinges	(by acoustic door manufacturer) x US26D
1	Exit Device (passage)	Adams Rite 3301 x 07 lever x US32D
1	Surface Closer	Dorma 8916AF89P x 693
1	Wall Stop	Trimco 1270WV x US32D
1	set Gasketing	(by acoustic door manufacturer) x US26D
1	Door Bottom	by acoustic door manufacturer

HARDWARE SET #8
Each to have:

2	Center Hung Floor Closer	Rixson 28 x SPLO 795 x Blackened Stainless
2	Sets Door Pull (BTB)	Trimco AP421 x 72”OA x Blackened Stainless
2	Door Stop	Trimco W1211 x 622

HARDWARE SET #9
Each to have:

1	Set Barn Door Hardware	KN Crowder CFT-201-CC-3-BP (300 lbs)
1	Sliding Door Lock	Accurate 2001ADAP-3 x US19LL
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D

C. The following hardware sets contain electrical components and need to be coordinated with the electrical and security drawings.

HARDWARE SET #E1
Each to have:

1	Continuous Hinge	Legacy 1019HD-MB x EPT Cutout
1	Power Transfer	Dorma ES105 x US32D
1	Electric Exit Device	Adams Rite 8801LR-M x 3001 x US32D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer/Stop	Dorma 8916SDS-FMC x 693
1	set Gasketing	Legacy 5924MB @ jambs & head
	Door Bottom	Legacy 7963MA
1	Saddle	Legacy (as detailed) x Alum
1	Power Supply	Adams Rite (to suit)

1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric lock.
    b. Free egress on secure side of door. RX switch in electric exit device shunts alarm.

HARDWARE SET #E1A
Each to have:

	Extended Hinges	Stanley (see description) x US1D
1	Power Transfer	Dorma ES105 x US32D
1	Electric Exit Device	Adams Rite 3701LR-M x 07 lever x US32D
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer	Dorma 8916AF89P x 693
1	Wall Stop	Trimco 1270WV x US32D
1	set Gasketing	Legacy 5884S-BK-FL @ jambs & head
1	Power Supply	Adams Rite (to suit)
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric exit device. When signaled from the fire alarm system or in the event of a loss of power the door automatically unlocks
    b. Free egress on secure side of door. RX switch in electric exit device shunts alarm.

HARDWARE SET #E2
Each to have:

	Hinges	(by balance door manufacturer)

1	Concealed Power Transfer	(by balance door manufacturer)
1	Electric Mortise Exit Device	Adams Rite 8330-LR x US32D
		(provide push pad for balance door)
1	Mortise Cylinder	Best (to suit) x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Pull w/mid post	Trimco AP421 x 96OA-P x 622
1	Power Supply	by Adams Rite to suit
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric exit device.
    b. Free egress on secure side of door. RX switch in electric lock shunts alarm.

HARDWARE SET #E3
Each to have:

	Hinges	Stanley (see description) x US26D
1	Electric Hinge	Stanley (8 wire as required) x US26D
1	Electric Lock	Best 45HW7DEU3R-RQE x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Surface Closer	Dorma 8616AF86P-FC x 693
1	Door Stop	Trimco (see description) x US26D
3	Silencers	Trimco 1229A
1	Power Supply	(by security vendor)
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric exit device.
    b. Free egress on secure side of door. RX switch in electric lock shunts alarm.

HARDWARE SET #E4
Each to have:

	Hinges	(by balance door manufacturer)
2	Electric Concealed Rod	Adams Rite 8933LR x US32D
	Exit Device	(provide push pad for balance door)
2	Mortise Cylinder	Best (to suit) x US26D
2	Temporary Core	Best (to suit) x US26D
2	Permanent Core	Best (to suit) x US26D
2	Door Pulls w/mid post	Trimco AP421 x 96OA-P x 622
	Power Supply	By Adams Rite to suit
2	Door Contact	(by security vendor)

1. Operation:

    a. During normal operating hours the exit devices are manually dogged by key, allowing doors to be opened and closed freely.
    b. Doors are monitored by the security system.

HARDWARE SET #E5
Each to have:

	Offset Pivot Hinges	by Acme x US26D
1	Electric Hinge	Stanley (8 wire as required) x US26D
1	Electric Lock	Best 45HW7DEU3R-RQE x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Glass Center Lock Casing	(by Acme Door)
1	Door Stop	Trimco (see description) x US26D

1	Set Seals	(by Acme Door)
1	Power Supply	(by security vendor)
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric exit device.
    b. Free egress on secure side of door. RX switch in electric lock shunts alarm.

HARDWARE SET #E6
Each to have:

	Offset Pivot Hinges	by Acme x US26D
1	Electric Hinge	Stanley (8 wire as required) x US26D
1	Electric Lock	Best 45HW7DEL3R-RQE x US26D
1	Temporary Core	Best (to suit) x US26D
1	Permanent Core	Best (to suit) x US26D
1	Glass Center Lock Casing	(by Acme Door)
1	Door Closer	Dorma 8616AF86P-FC x 693
1	Door Stop	Trimco (see description) x US26D
1	Set Seals	(by Acme Door)
1	Power Supply	(by security vendor)
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

1. Operation:

    a. Card reader on non-secure side of door unlocks electric lock. When signaled from the fire alarm system or in the event of a loss of power the door unlocks automatically.
    b. Free egress on secure side of door. RX switch in electric lock shunts alarm.

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SECTION 08 80 00 - 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 glass and glazing for the following:

1. Doors.
2. Entrances and storefronts.
3. Interior borrowed lites.
4. Interior mirrors, frameless.
5. Fritted glass.

B. Related Sections

1. Section 08 11 13 "Hollow Metal Doors and Frames"
2. Section 08 44 13 "Glazed Aluminum Curtain Walls"

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 E l52, 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 E 163, 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.

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.

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 land 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 the New York City Building Code.

1.5 SUBMITTAL PROCEDURES

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. 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 the New York City Building Code.

F. 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.

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 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.

1. Warranty Period: Manufacturer's standard but not less than five (5) years from 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, 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 from 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

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. Manufacturers include the following:

1. Vitro Architectural.
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. Ultra-Clear (Low-Iron) Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.

1. Low Iron Tempered Glass: Low iron glass, tempered in accordance ASTM C 1048, thicknesses as indicated.

a. Basis of Design Product: Subject to compliance with requirements, provide PPG; Starphire or comparable product by one of the following:

1). Pilkington
2). Saint Gobain
3). Or approved equal.

C. 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” 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.

D. Low 'E' Coated Glass: Provide high-performance, clear, metallic coating. 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" ultra-clear low-iron glass with 1/2" argon air space:

1. Visible Light Transmittance (VLT) 74%

2. Visible Light Reflectance, Exterior 11%

3. Visible Light Reflectance, Interior 12%

4. Solar Heat Gain Coefficient (SHGC) 0.41

5. Light to Solar Gain 1.80

E. 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: Eastman Chemical "Saflex" or "Vanceva," DuPont "Butacite," or approved equal, 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.

3. Minimum thickness of 1/4".

F. Insulating Glass: Insulated glass composition shall consist of 1/4" clear exterior lite of float (or tempered, where required) glass with Low E coating on No. 2 face, 1/2" air space and 1/4" clear interior lite of float (or tempered, where required) glass. Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 2190, and as follows:

1. Sealing System: Dual Seal.

2. Primary Sealant: Polyisobutylene.

3. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, Dow Corning 982, Tremco or approved equal.

   a. For structurally glazed IG units, secondary seal shall conform to ASTM C 1249.

4. Primary and secondary seals shall not contain voids and must be continuously bonded to the glass structure.

5. Spacer: Clear finish aluminum with welded, soldered, or bent corners, hollow tube types, filled with low nitrogen absorption desicant.

6. Desiccant: Molecular sieve, silica gel, or blend of both.

7. Air Space Thickness: 1/2".

8. Glass Thickness: 1/4" minimum.

9. 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.

10. 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.

11. 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.

G. Ceramic Frit Decorative Glass:

1. Heat-treated glass with ceramic coating complying with ASTM C1048, one surface ceramic-coated) Type 1 (transparent glass, flat), Quality Q3 (Glazing select) with other requirements as specified.

2. GANA/GTA 66-9-20, Specification for Heat-Strengthened or Fully Tempered Ceramic Enamel Spandrel Glass used for Building Window/Curtain Walls.

3. Custom pattern and color selected by the Commissioner.

4. At interior locations, providen sealer over frit to prevent infiltration of oils from peoples touch.

H. Frameless Mirrors: 1/4", Quality q2, clear float glass with silver, copper, and organic coating, and as follows:

1. Edges: Uniformly ground and polished.

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.

1. Product: Subject to compliance with requirements, provide one of the following:

a. Dow Corning; 795.
b. General Electric; Silglaze N 2500 or Contractors SCS-1000.
c. Tremco; Spectrem 2.
d. Or approved equal.

C. Weather Seal Sealant: Provide non-acid curing sealant with movement range ± 50%, ASTM C 719.

1. Product: Subject to compliance with requirements, provide one of the following:

a. Dow Corning; 795.
b. General Electric Silpruf.
c. Tremco; Spectrem 2.
d. 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% or 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 Adhesive: Adhesive mastic for adhering glass plate. Mastic must be compatible with mirror backing.

1. 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 requirements governing execution.

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.

1. Apply "pats" using electric applicator.

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 80 00

SECTION 08 90 00 - LOUVERS AND 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:

1. Aluminum louvers.
2. Blank-off panels.
3. Bird screens.

B. Related Sections

1. Section 04 20 00 “Unit Masonry”
2. Section 07 92 00 “Joint Sealants”
3. Section 08 11 13 “Hollow Metal Doors and Frames” for louvers in hollow metal doors.

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and snow and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter or permanent damage to fasteners and anchors.

1. Wind Load: Uniform pressure (velocity pressure) of not less than 30 lbf/sq. ft., acting inward or outward or greater if required by New York City Building Code 2014.

C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects.

1. Temperature Change (Range): 120 deg. F, ambient; 180 deg. F, material surfaces.

D. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

E. Field Measurements: Verify size, location and placement of louver units prior to fabrication.

F. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

G. Louvers must be tested and certified AMCA 500-L, AMCA 540 and AMCA 550 compliant.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit manufacturer's specifications, certified test data, where applicable, and installation instructions for required products, including finishes.

C. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

D. Samples: Submit six (6) inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include two (2) or more units in each sample showing limits of such variations.

1.5 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.6 WARRANTY

A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
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 LOUVER MATERIAL

A. Provide 4" deep, storm-resistant, drainable-blade, fixed, horizontal louver, Model No. EK4P as manufactured by Airolite, or Ruskin, Greenheck, or approved equal. Coordinate with Contract Documents for louver angles, configurations, and sizes.

B. Material: Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads. Louver must be designed to collect and drain water to exterior at sill by means of multiple gutters in blades and channels in jambs and mullions. Louvers and sill flashings to be installed in accordance with the manufacturer's recommended procedures to ensure complete water integrity performance of the louver system.

1. Frame and Blade Wall Thickness: 0.125".

2. Free Area: 58%.

C. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

2. Custom color and gloss as selected by the Commissioner.

D. Bird Screens

1. All louvers are to be furnished with bird screens, finish to match louvers.

2. Screens: 5/8" mesh, 0.050" thick expanded and flattened aluminum bird screen secured with 0.055" thick extruded aluminum frames. Provide frames with mitered corners and corner locks.

E. Insulated Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.

1. Thickness: 2"

2. Metal Facing Sheets, Aluminum: Minimum 0.032" nominal thickness.

3. Insulating Core: Expanded polystyrene (EPS) core having an R-value of 8.

4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard 0.050" thick formed aluminum channel frames, with corners mitered and with same finish as panels.

F. Fastenings: Provide stainless steel fasteners for exterior applications. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat head machine screws for exposed fasteners, unless otherwise indicated.

G. Anchors and Inserts: Use non-ferrous metal or hot dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

H. Bituminous Paint: SSPC-Paint 12 (cold applied asphalt mastic).

2.2 FABRICATION, GENERAL

A. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.

B. Include supports, anchorages, and accessories required for complete assembly.

C. Provide sill extensions made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.

D. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in masonry construction. Coordinate the delivery of such items to the project site.

3.3 INSTALLATION

A. Comply with manufacturer’s instructions and recommendations for installation of the work.

B. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designated, fabricated and fitted to the structure.

C. Anchor louvers to the building substructure.

D. Erection Tolerances:

1. Maximum variation from plane or location shown on the approved shop drawings: 1/8" per 12 feet of length, but not exceeding 1/2" in any total building length or portion thereof (non-cumulative).

2. Maximum offset from true alignment between two members abutting end to end, edge to edge in line or separated by less than 3": 1/16" (shop or field joints), under both load and no-load conditions.

E. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with their recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.

F. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.

G. Set units level, plumb and true to line, with uniform joints.

3.4 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

3.5 ADJUSTING AND CLEANING

A. Immediately clean exposed surfaces of the louvers to remove fingerprints and dirt accumulation during the installation process. Do not let soiling remain until the final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to the material finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and accessory components damaged during installation and construction so no evidence remains of corrective wok. If results of restoration are unsuccessful, as determined by the Commissioner, remove damaged materials and replace with new materials.

1. Touch up minor abrasions in finishes with a compatible air-dried coating that matches the color and gloss of the factory applied coating.

END OF SECTION 08 90 00

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SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

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. Gypsum shaftwall construction.
9. Bracing and connections.

B. Related Sections

1. Section 07 21 00 "Thermal Insulation"
2. Section 07 84 13 "Penetration Firestopping"
3. Section 08 11 13 "Hollow Metal Doors and Frames"
4. Section 09 90 00 "Painting and Coating"
5. Section 23 37 13 "Diffusers, Registers and Grilles"
6. Section 26 50 00 "Lighting"

1.3 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. Installer: Firm with not less than 3 years of successful experience in the installation of specified materials.

1.4 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: Submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

1.5 JOB MOCK-UP

A. Build 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.

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.

3. "J" Type: Formed from 20 U.S. Std. gauge galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

B. Vertical Movement Clips

1. Basis of Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Fastclip Side Clips (FCSC) or comparable product by one of the following:

a. Super Stud Building Products
b. Marino/Ware
c. Or approved equal.

C. 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. "C-H," "CT," or "I" Type Stud: 1-1/2" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.

4. Double "E" Type Stud or "J" Track with Holding Tabs: 1" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.

5. 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.

D. 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.

E. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

2.3 GYPSUM WALLBOARD TYPES

A. Gypsum Wall Board: 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 Wall Board: 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. Water Resistant Backing Board for Tile Finish: 5/8" thick unless otherwise noted. Cover joints with a pressure sensitive woven glass fiber tape.

1. Product: Subject to compliance with requirements, provide one of the following:

a. USG; Fiberock Aqua-Tough
b. Georgia Pacific; Dens-Shield Tile Backer Board
c. CertainTeed Corp.; DiamondBack Tile Backer
d. Or approved equal.

D. Moisture/Mold Resistant Gypsum Wall Board at locations listed below, unless otherwise shown on 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. Areas in toilet rooms, lockers, janitor's closets not scheduled to receive ceramic tile, or where fire rating is required.

2. Interior faces of exterior walls of basements, cellars and other below grade rooms.

3. Walls and ceilings of spaces containing condensers, water tanks, water pumps and pressure reduction valves.

4. Portions of walls within 2 feet of kitchen sinks to a height of 4 feet above the floor.

5. Portions of walls within 2 feet of kitchen stoves to a height of 4 feet above the floor.

6. Walls of bathrooms that are not solely water closet compartments, other than walls where cement board is specifically required.

7. Walls and ceilings in service sink closets.

8. Portion of walls within 2 feet of mop sinks or service sinks to a height of 4 feet above the floor.

9. All perimeter walls and wet shafts.

10. 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.

E. Mold Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges.

1. Liner board must have a rating 10 per ASTM D 3273 with a core that meets ASTM C 1396 Section 6.

2. Product: Subject to compliance with requirements, provide one of the following:

a. USG; Mold Tough Liner Panel
b. Georgia Pacific; DensGlass Ultra Shaft Guard
c. Lafarge/Continental; Mold Defense Shaftliner Type X and/or Weather Defense Shaftliner Type X
d. National Gypsum; Gold Bond Brand Fireshield Shaft Liner XP, Gold Bond Brand EXP Extended Exposure Shaft Liner
e. CertainTeed Corp.; M2Tech Shaftliner
f. 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: 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: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

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 requirements governing execution.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. General

1. 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.

2. 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 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 sag-resistant board for ceilings. 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 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. Cementitious Backer Board

1. General: Furnish cementitious backer board in maximum available lengths. Install horizontally, with end joints over framing members.

2. Fastening: Secure cementitious backer board to each framing member with screws spaced not more than 12 inches on center and not closer than 1/2" from the edge. Install screws with a conventional screw gun so that the screw heads are flush with the surface of the board.

3. Joint Treatment: Fill space between edge of backer and receptor with dry-set Portland cement or latex-Portland cement mortar. Fill all horizontal and vertical joints and corners with dry-set Portland cement or latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.

G. 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.

H. 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.

I. 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 C 754.

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 3.4, 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 retain 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 the 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 SHAFT WALLS

A. Runner Installation: Use "J" metal runners at floor and ceiling, with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and twenty-four (24) inches o.c.

B. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between J-runners.

C. C-H Studs: Cut metal studs 3/8" to not more than 1/2" less than floor to ceiling height and install between shaft wall liner panels so that panels are fitted snugly into the one (1) inch wide "H," "T," or "I" portion of the stud. Space studs twenty-four (24) inches o.c., unless otherwise indicated on drawings. Install full-length steel E-Studs or J-runners vertically at T-intersections, corners, door jambs, and columns. Install full length E-Studs or J-runners over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-runner at edges, horizontal runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to preserve structural support for wall. Over metal doors, install a cut to length section of runner and attach to strut-studs with clip angles and 3/8" Type S Screws space twelve (12) inches o.c.

D. Wallboard Installation - Double Layer Installation: Erect gypsum wallboard base layer vertically or horizontally to meet fire rating on one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type S screws twenty-four (24) inches o.c. Caulk perimeter of base layer panels.

Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type S screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.

E. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type S screws spaced eight (8) inches o.c. in field and along edges into studs.

F. Where handrails are indicated for direct attachment to drywall shaft system, provide not less than a sixteen (16) ga. x eight (8) inches wide galvanized steel reinforcement strip, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.

G. Integrate stair hanger rods with drywall shaft system by locating cavity of system as required to enclose rods.

3.7 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.

3.8 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.

END OF SECTION 09 21 16

SECTION 09 23 13 - ACOUSTICAL GYPSUM PLASTER

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 seamless absorptive plaster.

B. Related Sections

1. Section 06 10 00 "Rough Carpentry"

2. Section 09 21 16 "Gypsum Board Assemblies"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Manufacturer Qualifications: At least 3 years' experience fabricating and installing comparable work, employing skilled mechanics under competent supervision for all phases of the Work.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Shop Drawings/Product Data

1. Base drawings on field measurements.

2. Show dimensioned wall elevations with seam and joint locations, cutout sizes and locations, anchor locations, relation to adjacent work; large scale joint and mounting details; materials type, weight/thickness, design, color; and other data necessary to fabricate and install work and coordinate work with affected trades.

C. Mock-up: Provide full-size mockup including 2 connections and prefabricated corners demonstrating different geometric corners and shapes for Commissioner's approval.

D. Certification

1. Acoustical Performance: Certified reports of acoustical performance tests conducted and/or witnessed by a recognized, independent, testing agency. Tests shall have been done by specified methods or recognized equivalent. Sound absorption tests shall be not more than three years old. Reports on earlier tests are acceptable if it can be established to the Commissioner's satisfaction, that they are valid indications of compliance with Project requirements.

2. Fire Hazard: Evidence of compliance with regulatory agency and specifications requirements.

E. Cleaning and Maintenance Instructions: Recommendations for facility's maintenance and cleaning per DDC General Conditions. Identify cleaning/spotting products generically or by trade name.

1.5 REFERENCES

A. ASTM C 423: Test for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

B. ASTM E 84: Test for Surface Burning Characteristics of Building Materials.

1.6 DELIVERY, STORAGE AND HANDLING

A. Allow materials to become acclimated to Project conditions before installation, if necessary to prevent sag and distortion during service life.

1.7 ENVIRONMENTAL CONDITIONS

A. Work areas shall be at or near ambient occupancy temperature and relative humidity.

B. Painting, dust-raising activities, and work that introduces dampness shall be completed.

1.8 WARRANTY

A. Special Warranty for Acoustical Gypsum Plaster: Manufacturer agrees to repair or replace components of acoustical gypsum plaster installations that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Basis of Design: Subject to compliance with requirements, provide Baswaphon field-applied, seamless absorptive plaster as supplied by BASWA Acoustic North America, LLC, or Fellert Silk, Pyrok StarSilent or approved equal.

1. Finish: Classic Fine.

2. Products below are based on Baswaphon as basis of design.

B. Sound Absorbing Plaster System - Total System Thickness (adhesive, pre-coated mineral wool panels, Base 407 Coat and Fine Coat): Approximately 70mm.

C. Sound Absorbing Plaster System includes pre-coated mineral wool supporting panels, panel adhesive, fill, a base coat and a finish coat.

D. Trim Pieces: Provide white vinyl corner beads, reveals, terminations, control joints or other trim pieces manufactured by Trim-Tex or Vinyl Corp. or approved equal, in profiles approved by manufacturer. Trims must be installed with adhesive recommended by manufacturer.

E. Base and fine coats: Integrally colored by the addition of pigments provided by the manufacturer. Custom White Color to match Benjamin Moore Decorators White 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 requirements governing execution.

3.2 INSPECTION

A. Examine areas where and conditions under which seamless absorptive plaster is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected to permit the proper installation of the work.

B. All substrates for the application shall not vary from plumb, level or smooth consistent curvature more than 1/4 inch in 12 feet.

C. Verify that all mechanical and electrical services within area of application has been tested and approved, prior to commencement of application.

3.3 INSTALLATION

A. Install materials in accordance with the manufacturer's installation instructions and details. Installation shall start only after all other work in the area of the installation has been completed.

B. Install a field applied adhesive layer 3-mm thick, using adhesive and methods in accordance with manufacturer's installation instructions to the 63-mm thick Pre-Coated panels and adhere panels to stable substrate. Ensure that panels are set as level and as smooth to each other as practicable.

C. Install Trims with approved adhesives and cover with Pre-Coat.

D. Fill seams with Pre-Fill, sand Pre-Fill on panel seams and Pre-Fill on Trim completely smooth when dry.

E. Apply a 1.5-mm thick layer of Base-Coat 407, trowel smooth, sand completely smooth when dry.

F. Apply a 0.5-mm thick layer of Top-Coat and trowel smooth to a quality level consistent with accepted samples or mock-up. Note that coating is a hand troweled finished product. Inherent in all hand troweled product applications, minor trowel marks in the finished surface may occur. Critical lighting may expose minor trowel marks inherent in all hand troweled products. The finish should be viewed under end-use lighting conditions.

END OF SECTION 09 23 13

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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 floor, wall tile and base.

2. Setting beds, grout, sealant and waterproofing membrane.

B. Related Sections

1. Section 04 20 00 "Unit Masonry"

2. Section 09 21 16 "Gypsum Board Assemblies"

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 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 experienced tile setters who are completely familiar with the requirements of this work and the recommendations contained in the referenced standards.

1.5 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Samples

1. Submit sample panels, approximately 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.

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.

C. All floor surfaces shall have a minimum wet DCOF AcuTest value of 0.42 and tested per ANSI A326.3 Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

2.2 MANUFACTURERS OF TILE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Dal-Tile Corp.

2. Marazzi

3. Stone Source

4. Nemo

5. American Olean

6. Or approved equal.

2.3 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.

2.4 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. Product: Subject to compliance with requirements, provide one of the following:

a. MAPEI; Planicrete AC, blended with a 3:1 site mix
b. Laticrete; 333
c. Pro Spec; Acrylic Additive
d. Custom Building Products; Custom Crete Thin Set Additive
e. 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. Product: Subject to compliance with requirements, provide one of the following:

a. MAPEI; Keralastic System thin set mortar, consisting of Kerabond dry-set mortar and Keralastic latex admixture
b. Laticrete; 211 dry-set mortar and 4237 latex admixture
c. Pro Spec; Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture
d. Custom Building Products; Pro-Lite
e. Or approved equal.

F. Wall and Base Tile

1. Over drywall, use ANSI A136.1-1967 Organic Adhesive for installation of Ceramic Tile, Type I and ISO 13007 D2TE. Shear strength shall be 50 psi minimum. Adhesive primer as recommended by adhesive manufacturer. Manufacturer shall certify, in writing, that adhesive and primer used are proper types for the intended tile types and application. Conform to TCA Detail W-242.

a. Product: Subject to compliance with requirements, provide one of the following:
1). MAPEI; Type 1 Mastic.

2). Laticrete; Type 1 Adhesive.
3). ProSpec; B-1000 Tile Adhesive.
4). Custom Building Products; Reliabond Adhesive Type 1.
5). Or approved equal.

2. Over masonry, use a mortar bed leveling coat conforming to ANSI A108.1A followed by a Latex Portland Cement Bond Coat, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-211.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide MAPEI; Kerabond/Keralastic System or comparable product by one of the following:
      1). Laticrete
      2). Pro Spec
      3). Custom Building Products
      4). Or approved equal.

3. Over cement board, use a Latex Portland cement mortar bond coat, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-244; coat back of board with waterproof membrane as specified below.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide MAPEI; Kerabond/Keralastic System or comparable product by one of the following:
      1). Laticrete
      2). Pro Spec
      3). Custom Building Products
      4). Or approved equal.

4. Over glass mat water resistant gypsum backer board, use a Latex Portland cement mortar bond coat, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-245.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide MAPEI; Kerabond/Keralastic System or comparable product by one of the following:
      1). Laticrete
      2). Pro Spec
      3). Custom Building Products
      4). Or approved equal.

G. Floor Tile: Comply with TCNA Detail F-144, thinset and waterproofing over CBU over plywood. CBU to be screwed down and joints to be finished per manufacturer's requirements.

H. Waterproofing Membrane: Complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner.

   1. Reinforce membrane with polyester fabric.

   2. Run waterproofing up full height of walls.

   3. Product: Subject to compliance with requirements, provide one of the following:

      a. Mapei; Mapelastic 400 with factory blended Bio-Block antimicrobial protection

b. Laticrete; Laticrete 9235 with Microban
c. ProSpec; B6000
d. Custom Building Products; 9240
e. Or approved equal.

I. Water: Clean, fresh and suitable for drinking.

J. Grout complying with A118.7; and ISO 13007, CG2WAF: For grouting ceramic tile, provide a commercial Portland cement grout. Add latex additive to grout if required by manufacturer; additive shall be made by same manufacturer as grout.

1. Color: Silver Grey unless otherwise noted.

2. Basis-of-Design Product: Subject to compliance with requirements, provide Mapei; Ultracolor Plus FA (additive not required) or comparable product by one of the following:

a. Laticrete
b. Custom Building Products
c. Or approved equal.

K. 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.

L. Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout

1. Basis-of-Design Product: Subject to compliance with requirements, provide Aqua Mix Inc.; Sealer's Choice 15 Gold or comparable product by one of the following:

a. DuPont
b. 3M
c. Or approved equal.

M. 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.

N. 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.

2.5 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.

1. Product: Subject to compliance with requirements, provide one of the following:

a. GE Construction Sealants; Sanitary SCS1700
b. Dow Corning Corporation; 786-M White
c. May National Associates, Inc. A Subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF
d. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 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.

3.3 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 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.

3.4 INSTALLATION

A. Comply with the following installation standards:

1. Wall tile over drywall using organic adhesive - ANSI A136.1 and ISO 13007, D2TE.

2. Wall tile over cement board or glass mat backer board using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES2P2.

3. Wall tile over masonry or concrete using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES2P2.

4. Floor tile: ANSI A118.1, ANSI A118.4.

B. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.

C. 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.

D. Waterproofing Membrane: Install the membrane in strict accordance with manufacturer's written recommendations.

E. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.

F. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.

G. 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.

H. 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.

3.5 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.

END OF SECTION 09 30 13

SECTION 09 64 53 - RESILIENT WOOD FLOORING ASSEMBLIES

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. Wood flooring materials.
2. Sound isolation membrane.
3. Accessories.

B. Related Sections

1. Section 06 10 00 "Rough Carpentry"
2. Section 09 90 00 "Painting and Coating"

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Submit product data including manufacturer's detailed technical product data and instructions for installation, handling, storage, moisture protection, anchorage, finishing, protection, and maintenance.

C. Submit shop drawings showing layout and installation details including method of attachment, substrate conditions, relationships to surrounding construction, perimeter details and other information and components not fully dimensioned or detailed in manufacturer's product data. Include layout, colors, widths, and dimensions of finish markings.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Installer Qualifications: Engage an experienced Installer who specializes in installing types of wood flooring similar to those required for this Project.

1. Engage a qualified Installer for the wood flooring system to assume undivided responsibility for installing the complete flooring system, including anchorage system, acoustic underlayment, flooring, trim, expansion provisions, finish, markings, and other accessory items indicated.

1.5 DELIVERY, STORAGE AND HANDLING

A. Moisture Content: At time of delivery to Project, maintain 6 to 9 percent average moisture content.

B. Protect wood flooring from excessive moisture in shipment, storage and handling. Deliver in unopened cartons or bundles and store in a dry place, with adequate air circulation. Do not deliver material to building until "wet work" such as concrete and plaster have been completed and cured to a condition of equilibrium.

1.6 PROJECT CONDITIONS

A. Conditioning: Do not proceed with installation of wood flooring until spaces have been enclosed and are at approximate humidity condition planned for occupancy. Condition wood for five (5) days prior to start of installation by placing in spaces to receive flooring and maintaining ambient temperature between 65 degrees F. and 70 degrees F. before, during and after installation. Open packages of wood flooring materials which are sealed to permit natural adjustment of moisture content.

1.7 WARRANTY

A. Special Warranty for Resilient Wood Flooring Assemblies: Manufacturer agrees to repair or replace components of resilient wood flooring assemblies that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WOOD FLOORING MATERIALS

A. Tempered Hardboard: 1/4″ tempered hardboard (high density fiberboard).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Weber Plywood
b. Richwood Industries, Inc.
c. Kronospan
d. Or approved equal.

B. Plywood: 3/4″ B/C tongue and groove exterior grade plywood.

C. Sound Isolation Membrane: 3/8" (10mm) thick acoustic rollout underlayment.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Regupol; Sonus HS 1000, 10mm or comparable product by one of the following:

a. Ecore
b. Pliteq
c. Or approved equal.

D. Perimeter Isolation Board: 3/8" thick polyethylene foam perimeter isolation board.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Kinetics Noise Control; SRP (Sound Rated Perimeter Strip) or comparable product by one of the following:

a. Acoustical Solutions
b. Ecore
c. Or approved equal.

E. Perimeter Sealant

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sika; Sikahyflex-150 LM or comparable product by one of the following:

a. Dow Corning
b. Tremco
c. Or approved equal.

F. Paint Finish: See Section 09 90 00 "Painting and Coating".

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. General: Comply with flooring manufacturer's instructions and recommendations for applications indicated.

1. Tolerances: Level wood flooring system to a tolerance of 1/8" in 10 feet.

B. Install wood blocking as required for leveling floor system.

C. Install first layer of plywood perpendicular to structural subfloor. Leave 3/8" gap for expansion at edge of floor.

D. Install acoustic underlayment. Leave 3/8" gap for expansion at edge of floor.

E. Install second layer of plywood perpendicular to first layer of plywood. Leave 3/8" gap for expansion at edge of floor.

F. Install tempered hardboard flooring, perpendicular to plywood, by screwing to substrate, leaving 3/32" gaps between panels for expansion with end joints staggered. Leave 3/8" gap for expansion at edge of floor. Pre-drill and counter-sink screws through hardboard panel face extending 1" into substrate. Locate screws at 16" intervals along center of both panel axes, at panel corners, and at 16" intervals around perimeter of each panel. Screws at edge should be 1/2" from edge. Use no adhesives.

G. Paint exposed surfaces of tempered hardboard flooring; see Section 09 90 00 "Painting and Coating".

END OF SECTION 09 64 53

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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.

B. Related Sections

1. Section 03 30 00 "Cast-in-Place Concrete"

2. Section 22 40 00 "Plumbing Fixtures" for floor drains.

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data

C. Material certificates signed by manufacturer certifying that the composition flooring complies with requirements specified herein.

D. Samples for Initial Selection: Manufacturer's color charts showing full range of colors and finishes available.

E. Samples for Verification: 2-1/2" x 4" samples of each material specified herein with color from color chart selection designated by the Commissioner.

F. Material certificates signed by manufacturer certifying that the resinous flooring complies with requirements specified herein.

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 has been properly instructed by 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.

PART 2 - PRODUCTS

2.1 PRODUCT DESCRIPTION

A. Resinous Flooring: 1/8" Dur-A-Quartz, multiple component, orange peel finish (two top coats) solid color as selected by Commissioner, seamless flooring as manufactured by Dur-A-Flex Inc., or comparable product by General Polymers, Stonhard or approved equal.

B. Colors: As selected by Commissioner from manufacturer's standard solid colors, chips and quartz.

C. Physical Properties

1. Compressive Strength (ASTM D 695): 17,500 psi.
2. Tensile Strength (ASTM F 638): 4,000 psi.
3. Tensile Elongation (ASTM D 638): 7.5%.
4. Flexural Strength (ASTM D 790): 6,250 psi.
5. Linear Shrinkage (ASTM D 2566): 0.02%.
6. Hardness (ASTM D 2240): Shore D 75-80.
7. Impact Resistance (MIL D 3134): No cracking or delamination.
8. Indentation (MIL D 3134): 0.25.
9. Coefficient of Friction (ASTM C 1028): 0.8 (one topcoat -standard).
10. Bond Strength To Concrete (ACI 403): 335 psi, concrete fails.
11. Shear From Steel Plate (MIL D 3134): 1,050 psi.
12. Elevated Temperature (MIL D 3134): No slip or flow.
13. Water Absorption (ASTM D 570): 0.04%.
14. Electrical Conductivity: Non-conductive.
15. Flammability (ASTM D 635): Self extinguishing.
16. Abrasion Resistance Taber Abrader (weight loss CS17 wheels, 2000 gm. load, 1000 cycles): 0.24 grams.
17. Toxicity: Non-toxic, USDA approved.

2.2 ACCESSORIES

A. Underlayment: Provide acrylic modified Portland cement mortar as recommended by manufacturer of flooring. Include reinforcing and additional materials required by the manufacturer to provide an acceptable substrate for application of finish flooring.

B. Primer: As recommended by resinous flooring manufacturer.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Adhere strictly to resinous flooring manufacturer’s current written instructions.

B. Apply underlayment in accordance with manufacturer’s recommendations.

C. Apply two coats of 1/8” flooring membrane for approximate thickness of 3/16”.

D. Dispose of application debris properly.

E. Apply two coats of clear coating in accordance with manufacturer’s recommendation.

3.3 DETAILS

A. Thoroughly rout, vacuum and fill moving cracks and joints with filler as recommended by resinous flooring manufacturer.

B. Pre-patch surface deviations with patching compound comprised of 100% solids epoxy/aggregate.

C. “Key in” all drains, edges and transition points according to manufacturer’s instructions.

D. Install a 4” integral cove base at perimeter walls.

3.4 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. Repair all leaks and repeat test until no leakage is observable.

3.5 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

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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 of or repairing of abraded, damaged or rusted prime coats.
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. Sealing concrete floors.
8. Epoxy wall coating.
9. Pavement marking paint.
10. Painting wood (tempered hardboard) flooring.
11. 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.
12. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
13. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
14. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
15. 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. Section 09 21 16 "Gypsum Board Assemblies"

2. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.

3. 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.

4. Color Coding of Mechanical Piping and Electrical Conduits

a. Section 22 05 53 "Identification for Plumbing Piping and Equipment"
b. Section 23 05 53 "Identification for HVAC Piping and Equipment"
c. Section 26 05 53 "Identification 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. Factory-finished toilet partitions.

B. Factory-finished acoustical tile.

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 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.

1.5 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.

1.6 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 MANUFACTURERS

A. Except as otherwise noted, provide the painting products listed in schedule of finishes for all required painting. Comply with number of coats and required minimum mil thicknesses as specified herein.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore (Moore)

2. PPG Paints (PPG)

3. Sherwin Williams (S-W)

4. Or approved equal.

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 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.

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. High Performance Coating on Exterior Galvanized Ferrous Metals

1. First Coat

a. Tnemec; 27 Typoxy or N69 Epoxoline II
b. International Protective Coatings; Intergard 345
c. Carboline; Carboguard 893 SG or Carboguard 888
d. Akzo; Devran 203 WB Epoxy Primer
e. Cortech/Moore; Epoxy Mastic Coating V 160 Series
f. Sherwin Williams; Recoatable Epoxy Primer 867-45
g. Or approved equal.

2. Second Coat

    a. Tnemec; V73 Endura Shield or 1074/1075
    b. International Protective Coatings; Interthane 870UHS or 990 UHS
    c. Carboline; Carbothane 133 LH
    d. Akzo; Devthane 379UH Aliphatic Vizethne
    e. Corotech/Moore; Acrylic Aliphatic Urethane V 500 (Gloss) or V 510 (Semi-Gloss)
    f. Sherwin Williams; Hi-Solids Urethane B65-300/350
    g. Or approved equal.

B. High Performance Coating on Exterior Non-Galvanized Ferrous Metals

1. Prime Coat

    a. Tnemec; Tneme-Zinc 90/97
    b. International Protective Coatings; Interzinc 52 or 315
    c. Carboline; Carbozinc 859, Class B
    d. Akzo; Cathacoat 302V Reinforced Inorganic Zinc Primer
    e. Corotech/Moore; Organic Zinc Rich Primer V 170
    f. Sherwin Williams; Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212
    g. Or approved equal.

2. Second Coat

    a. Tnemec; 27 Typoxy or N69 Epoxoline II
    b. International Protective Coatings; Intergard 345
    c. Carboline; Carboguard 893 SG or Carboguard 888
    d. Akzo; Bar-Rust 231V Multi Purpose Epoxy Mastic
    e. Corotech/Moore; Epoxy Mastic Coating V 160 Series
    f. Sherwin Williams; Macropoxy 646 I.C. Epoxy B58-600
    g. Or approved equal.

3. Third Coat

    a. Tnemec; V73 Endura Shield or 1074/1075
    b. International Protective Coatings; Interthane 870UHS or 990 UHS
    c. Carboline; Carbothane 133 LH
    d. Akzo; Devthane 379 UH Aliphatic Urethane
    e. Corotech/Moore; Acrylic Aliphatic Urethane V 500 (Gloss) or V 510 (Semi-Gloss)
    f. Sherwin Williams; Hi-Solids Polyurethane B65-300/350
    g. Or approved equal.

C. Interior Ferrous Metal

1. Semi-Gloss Finish/Latex

    a. Primer:
        1). 1 coat Moore; Ultra Spec-HP Acrylic Metal Primer (HP04)
        2). 1 coat PPG; Devflex 4020 PF DTM Primer/Flat Finish
        3). 1 coat S-W; Pro-Industrial Pro-Cryl Universal Primer B66-3100 Series

4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Ultra Spec HP DTM Acrylic Semi-Gloss (HP29)
2). 1 coat PPG; Pitt Glaze WB1 Pre-Catalyzed Semi-Gloss Epoxy 16-510
3). 1 coat S-W; Pro Industrial Acrylic Semi-Gloss, B66-650 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Ultra Spec HP DTM Acrylic Semi-Gloss (HP29)
2). 1 coat PPG; Pitt Glaze WB1 Pre-Catalyzed Semi-Gloss Epoxy 16-510
3). 1 coat S-W; Pro Industrial Acrylic Semi-Gloss, B66-650 Series
4). Or approved equal.

d. Total DFT not less than: 4.0 mils

D. Interior Concrete Block

1. Semi-Gloss Finish/Vinyl Acrylic Latex over Filler

a. Block Filler:
1). 1 coat Moore; Ultra Spec Masonry Int./Ext. High Build Block Filler (571)
2). 1 coat PPG; Speedhide HI Fill Latex Block Filler 6-15XI
3). 1 coat S-W; Pro Industrial Heavy-Duty Block Filler, B42-150
4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Gloss (N540)
2). 1 coat PPG; Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI Series
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Gloss (N540)
2). 1 coat PPG; Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI Series
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
4). Or approved equal.

d. Total DFT not less than: 10.7 mils

E. Interior Drywall

1. Flat Finish/Vinyl Acrylic Latex

a. Primer:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Primer (N534)
2). 1 coat PPG; Speedhide Zero Interior Latex Primer 6-4900XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Primer, B28-2600
4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Ultra Spec 500 Latex Flat (N536)
2). 1 coat PPG; Speedhide Zero Interior Latex Flat 6-4110XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Flat, B30-12600 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Ultra Spec 500 Latex Flat (N536)

2). 1 coat PPG; Speedhide Zero Interior Latex Flat 6-4110XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Flat, B30-12600 Series
4). Or approved equal.

d. Total DFT not less than: 3.6 mils

2. Eggshell Finish/Vinyl Acrylic Latex

a. Primer:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Primer (N534)
2). 1 coat PPG; Speedhide Zero Interior Latex Primer 6-4900XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Primer, B28-2600
4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Eggshell (N538)
2). 1 coat PPG; Speedhide Zero Interior Latex Eggshell 6-4310XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Ultra Spec 500 Interior Latex Eggshell (N538)
2). 1 coat PPG; Speedhide Zero Interior Latex Eggshell 6-4310XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
4). Or approved equal.

d. Total DFT not less than: 3.8 mils

F. Interior Painted Wood

1. Satin Finish/Latex

a. Primer:
1). 1 coat Moore; Advance Waterborne Int. Alkyd Primer (790)
2). 1 coat PPG; Seal Grip Interior Primer/Finish 17-951
3). 1 coat S-W; Multi-Purpose Latex Primer/Sealer B51 Series
4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Advance Waterborne Int. Alkyd Satin (792)
2). 1 coat PPG; Speedhide Zero Interior Latex Satin, 6-4410XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Advance Waterborne Int. Alkyd Satin (792)
2). 1 coat PPG; Speedhide Zero Interior Latex Satin, 6-4410XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-1900 Series
4). Or approved equal.

d. Total DFT not less than: 4.0 mils

2. Semi-Gloss Finish/Latex

a. Primer:
1). 1 coat Moore; Advance Waterborne Int. Alkyd Primer (790)
2). 1 coat PPG; Seal Grip Interior Primer/Finish 17-951

3). 1 coat S-W; Multi-Purpose Latex Primer/Sealer B51 Series
4). Or approved equal.

b. First Coat:
1). 1 coat Moore; Advance Waterborne Int. Alkyd (793)
2). 1 coat PPG; Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
4). Or approved equal.

c. Second Coat:
1). 1 coat Moore; Advance Waterborne Int. Alkyd (793)
2). 1 coat PPG; Speedhide Zero Interior Semi-Gloss Latex, 6-4510XI
3). 1 coat S-W; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
4). Or approved equal.

d. Total DFT not less than: 3.8 mils

G. Paint for Wood (Tempered Hardboard) Flooring

1. Low Sheen Finish

a. Primer - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Fresh Start High-Hiding All Purpose Primer (046) or comparable product by one of the following:
1). PPG
2). Sherwin Williams
3). Or approved equal.

b. First Coat - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Latex Floor and Patio High Gloss Enamel (121) or comparable product by one of the following:
1). PPG
2). Sherwin Williams
3). Or approved equal.

c. Second Coat - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Latex Floor and Patio High Gloss Enamel (121) or comparable product by one of the following:
1). PPG
2). Sherwin Williams
3). Or approved equal.

2. High Gloss Finish

a. Primer - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Fresh Start High-Hiding All Purpose Primer (046) or comparable product by one of the following:
1). PPG
2). Sherwin Williams
3). Or approved equal.

b. First Coat - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Latex Floor and Patio Low Sheen Enamel (N122) or comparable product by one of the following:
1). PPG
2). Sherwin Williams

3). Or approved equal.

c. Second Coat - Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore; Latex Floor and Patio Low Sheen Enamel (N122) or comparable product by one of the following:
   1). PPG
   2). Sherwin Williams
   3). Or approved equal.

H. Concrete Floor Sealer: Water-based, low-VOC acrylic sealer.

1. Product: Subject to compliance with requirements, provide one of the following:

   a. Euclid Chemical Company; Everclear VOX
   b. V-Seal; V-Seal 101
   c. Seal-Krete; Penetrating Sealer
   d. Or approved equal.

I. Epoxy Wall Paint for Drywall Surfaces

1. Primer, 1 coat, 5-7 mils DFT

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; 201 Epoxoprime or comparable product by one of the following:
      1). Benjamin Moore
      2). Sherwin Williams
      3). Or approved equal.

2. First Coat, 1 coat, 6-10 mils DFT

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; Series 280 Tneme Glaze or comparable product by one of the following:
      1). Benjamin Moore
      2). Sherwin Williams
      3). Or approved equal.

3. Second Coat, 1 coat, 2-3 mils DFT

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; 1080/1081 Endura-Shield WB or comparable product by one of the following:
      1). Benjamin Moore
      2). Sherwin Williams
      3). Or approved equal.

J. Epoxy Wall Paint for Masonry Surfaces

1. Primer, 1 coat, 60-80 sq. ft./gallon

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; 130 Envirofill or comparable product by one of the following:
      1). Benjamin Moore
      2). Sherwin Williams

3). Or approved equal.

2. First Coat, 1 coat, 6-10 mils DFT

a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; Series 280 Tneme Glaze or comparable product by one of the following:
1). Benjamin Moore
2). Sherwin Williams
3). Or approved equal.

3. Second Coat, 1 coat, 2-3 mils DFT

a. Basis-of-Design Product: Subject to compliance with requirements, provide Tnemec; Endura-Shield WB or comparable product by one of the following:
1). Benjamin Moore
2). Sherwin Williams
3). Or approved equal.

K. Pavement Marking Paint: Factory-mixed, quick-drying non-bleeding paint specifically formulated for marking asphaltic concrete surfaces, yellow color.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams; Setfast Acrylic Waterborne Traffic Marking Paint (TM226) or comparable product by one of the following:

a. Tnemec
b. Benjamin Moore
c. Or approved equal.

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 requirements governing execution.

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 workers skilled in the trades involved.

C. Remove electrical panel box covers and doors before painting walls. Paint separately and reinstall 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. 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 21 16 "Gypsum Board Assemblies".

C. Wood Surfaces: Sand to remove all roughness, loose edges, slivers, 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.

D. 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 with Portland cement grout, and bag surface so that it has approximately the same texture as the adjacent masonry surface.

E. Testing for Moisture Content: Contractor shall test all 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.

F. 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, convector 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 repair abraded, chipped, or otherwise defective surfaces.

END OF SECTION 09 90 00

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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 INTERIOR PANEL SIGNAGE

A. Fire egress, floor, and other signs required by Code:

1. Interior Panel Signs: Provide ultra matte smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, manufactured from manufacturer's standard acrylic sheet, unframed. Comply with requirements indicated for finishes, colors, designs, shapes, sizes, and details of construction.

2. Engraved Copy: Reverse Engraved.

3. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, in contrasting color.

B. Basis of Design Product: Subject to compliance with requirements, provide aluminum plate room identification signage manufactured by Rowmark or a comparable product by one of the following:

1. ASI Sign Systems, Inc.

2. Andco Industries Corp.

3. Or approved equal.

2.2 EXTERIOR ADDRESS LETTERS

A. 1/16” thick blackened steel cut out letters.

B. Attachment: Double stick tape

2.3 EXTERIOR SPINKLER SIGNAGE MATERIALS

A. Provide aluminum plate exterior sprinkler sign.

1. Size: See Drawings

2. 1/4" thick aluminum.

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: Engraved

7. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, matching backplate.

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 requirements governing execution.

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 22 19 - DEMOUNTABLE PARTITIONS

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. All glass partitions.
2. Steel framed glazed partition system.
3. Doors and frames in partition system.
4. Finish hardware for doors.

B. Related Sections

1. Section 08 11 13 “Hollow Metal Doors and Frames”
2. Section 08 71 00 “Door Hardware”
3. Section 08 80 00 “Glazing”
4. Section 09 21 16 "Gypsum Board Assemblies"

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit manufacturer's detailed materials and fabrication specifications and installation instructions. Include catalog cuts of hardware, fastenings and other data as required.

C. Shop Drawings: Submit shop drawings for fabrication and erection of partition assemblies which are not fully described by manufacturer's data. Show anchorage and accessory items and finishes.

D. Samples: Submit samples of each required finish and color. Prepare samples on same materials which will be used in partition assemblies.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Manufacturer: Provide office partition system manufactured by a single firm specializing in production of this type of work.

C. Shop Assembly: Preassemble items in shop to greatest extent possible. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

D. Installed partitions must have a deflection limit of L/240 when subject to a 5 psf uniform lateral load and a concentrated load of 200 lbs.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver demountable panel partition components cartoned or crated to provide protection during transit and job storage.

B. Inspect partition components upon delivery for damage. Minor damages may be repaired, provided finish items are equal to new work and acceptable to Commissioner. Remove and replace damaged items as directed.

C. Store partition components on raised platforms in vertical positions with blocking between units to allow air circulation. Keep stored material covered and protected from damage.

PART 2 - PRODUCTS

2.1 ALL GLASS PARTITIONS

A. System: Top and bottom channel frame as detailed, full height tempered glass glazing.

B. Basis-of-Design Product - Top and Bottom Channels: Subject to compliance with requirements, provide C.R. Laurence Co., Inc.; 7/8" x 1 1/4" CRL "Wide Channel" or comparable product by one of the following:

1. U.S. Aluminum

2. MetroWall

3. Or approved equal.

C. Glass: Tempered glass; refer to Section 08 80 00 “Glazing.”

D. Silicone Sealant: As recommended by manufacturer.

2.2 STEEL FRAMED GLAZED PARTITION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide Inscape; Acme 50 or comparable product by one of the following:

1. C.R. Laurence Co., Inc.

2. Dorma USA, Inc.

3. Or approved equal.

B. Materials

1. Metal: Steel, cold-rolled, annealed, stretcher-leveled furniture stock free of pits, scale, and other surface defects, conforming to ASTM A366, Type B, CS (commercial steel).

a. Posts: Formed of 18 gauge steel.
b. Bases: Formed of 18 gauge steel, independently removable for access to wiring raceways.
c. End fillers and closures: Formed of 20 gauge steel and filled with 6 lb. density acoustic fiberglass insulation; perimeter sealed with acoustical sealant.
d. Panels: Fabricated of 16 gauge steel.
e. Ceiling channel: Fabricated of 18 gauge steel.

2. Glass and Glazing Accessories: Conform to the requirements of Section 08 80 00 “Glazing.”

3. Doors and Frames: Conform to the requirements of Section 08 11 13 “Hollow Metal Doors and Frames.”

4. Door Hardware: Conform to the requirements of Section 08 71 00 “Door Hardware.”

5. Insulation: Inorganic, incombustible mineral wool filler for sound deadening.

6. Light and Sound Seals: Dense, compressible neoprene or other acceptable flexible, non-hardening gasket material.

C. Fabrication

1. Panels: Flush hollow unit construction, minimum 16 gauge steel facing sheets, smooth and free of buckles, oil canning, and seams. Provide stiffening members welded to inside surfaces of panel faces or provide gypsum board backing solidly laminated to entire back surface of panel. Enclose perimeter edges of each panel with metal.

a. Construct panels to interlock with adjoining panels or use internal vertical supports to ensure secure, rigid joints. Provide integral glazing recesses or other frame for glass at glazed openings. Insulate panels with inorganic mineral filler packed solidly for sound deadening.

2. Base: Provide recessed, steel channel, 18 gauge.

3. Ceiling Trim: Minimum 20 gauge steel continuous profile, adjustable to variations in ceiling level, securely fastened to ceiling, with light and sound seal at ceiling contact.

4. Field Joints: Provide concealed splice at field joints to ensure rigidity and alignment.

5. Electrical Cutouts: Provide cutouts in panels or base for electrical outlets shown on Electrical drawings.

6. Door Frames: 18 gauge minimum steel, vertically adjustable to suit floor irregularities, with continuous sound-deadening closure seals at jamb and head stops. Mortise and reinforce frames to retain required hardware and to stiffen frame. Drill and tap for machine screws for mortise hardware per templates furnished with hardware. Conform to the requirements of Section 08 11 13 “Hollow Metal Doors and Frames.”

a. Reinforce heads of frames to receive surface-mounted door closers whether or not such closures are indicated.

7. Telescoping Sliding Door System: Provide manufacturer’s standard top-mounted concealed (in ceiling) sliding track and concealed floor guide at sliding doors. Sliding mechanism must be designed for 1/2" thick glass doors weighing up to 325 lbs, with four-wheel carrier, center hung for efficient

operation. Vertical adjustment of 1/2". Heavy duty aluminum I-Beam track; jump proof design. Conforms to ANSI/BMHA standards, Grade 1. Adjacent telescoping doors will be activated by bottom rail J-Hook beneath the door and cushioned with heavy-duty rubber bumpers.

8. Offset Pivot Doors

   a. Door No. 113: 1 3/4" Offset Pivot Flush Wood Door
   b. Door Nos. 116, 118: 1 3/4" Offset Pivot Framed Glass Door with mortise lock box

9. Hardware: Install locks, door closers, door stops, thresholds, and other hardware furnished under the Section 08 71 00 “Door Hardware” for doors in demountable partitions. Install door bottoms and lock-reinforcing units at factory. Install other hardware at job site.

10. Furnish and install the following hardware:

    a. Off set center hung pivot hardware.
    b. Fasteners: Provide Phillips-head screws and bolts, nuts, washers, grommets, and other fastening devices of appropriate type, metal, and finish. Countersink screws and bolts.
    c. For balance of hardware, see Section 08 71 00 “Door Hardware.”

11. Finishes: Steel to be shop finished with manufacturer’s standard factory applied paint finish complying with ANSI A250.3; custom color and glass as selected by the Commissioner.

12. Glazing: Set glass in glazing strips for firm retention and tight seal and to permit easy removal and reinstallation without damage. Loose glazing stops and exposed screws are not acceptable.

13. Connectors and Accessories: Provide connectors, fasteners, and accessories required for rigid, secure, complete, and finished demountable metal partition system.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Install partitions before floor coverings and after suspended drywall ceilings have been installed. Coordinate partition work with work of other trades which are affected by partition installation. Avoid damage to installed work.

B. Restore damaged or defaced work or replace with new work, as acceptable to Commissioner. Completely refinish defaced partition components with factory finished materials, or replace defaced components.

C. Furnish, drill for and install anchoring devices required, and secure partitions to floor, ceiling and walls, using concealed fasteners.

D. Install partitions rigid, level, plumb and in alignment, with components secure together, in accordance with manufacturer's instructions.

E. Provide through posts to ceiling, or other concealed supports as required to ensure lateral stability of partition runs.

F. Install continuous and positive seal to prevent light and sound transmission at partition contacts with floor, ceiling, wall and other abutting surfaces.

G. Adjust hardware and doors and leave in proper operating condition.

END OF SECTION 10 22 19

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SECTION 10 28 13 - TOILET 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 21 16 "Gypsum Board Assemblies"

3. Section 09 30 13 "Ceramic Tiling"

1.3 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.

C. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to ensure proper operation and servicing of accessory units. Accessories must be installed at heights in compliance with 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.

1.4 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 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.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Fifteen years from date of Substantial Completion.

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: Theft-proof 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 that is fully concealed when unit is closed.

2.4 TOILET ACCESSORIES

A. Baby Changing Table (AC-BCT1): Recessed-mounted, stainless steel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc.; 9013 Recessed Stainless Steel Baby Changing Station or comparable product by one of the following:

a. Bradley Corp.
b. Koala Kare Products
c. Or approved equal.

B. Electric Hand Dryers

1. Description: High-speed, warm-air hand dryer for rapid hand drying.

2. Mounting: Recessed.

3. Operation: Infrared-sensor activated with timed power cut-off switch.

4. Cover Material and Finish: Stainless steel, Type 304, No. 4 finish (satin).

5. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc.; Turbo-Tuff Recessed High Speed Hand Dryer or comparable product by one of the following:

a. Bobrick Washroom Equipment Co.
b. Bradley Corp.
c. Or approved equal.

C. Grab Bars (AC-G1, AC-G2, AC-G3, AC-G4): 1-1/4" diameter stainless steel tubing with satin finish, slip-resistant surface, peened finish.

1. Mounting: Flanges with concealed fasteners.

2. Length

a. AC-G1: 18″
b. AC-G2: 30″
c. AC-G3: 36″
d. AC-G4: 42″

3. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-5806 Series or comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corp.
c. Or approved equal.

D. Mirror (AC-M1): First quality 1⁄4" polished float glass, warranted for 15 years against silver spoilage with back protected by shock-absorbing padding.

1. Frame: Stainless steel channel with mitered corners. 1/2"x1/2"x3/8" channel-frame, type 430 stainless steel with bright-polished finish.

2. Size: 24″ x 36″

3. Hangers: Manufacturer's standard rigid, tamper and theft resistant hangers for concealed mounting.

4. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-165 2436 Channel-Frame Mirror or comparable product by one of the following:

   a. American Specialties, Inc.
   b. Bradley Corp.
   c. Or approved equal.

E. Soap Dispensers (AC-SD1): Wall-mounted, 18 gauge stainless steel/satin-finish, automatic dispenser.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-2013 or comparable product by one of the following:

   a. American Specialties, Inc.
   b. Bradley Corp.
   c. Or approved equal.

F. Sanitary Napkin Disposal Unit (AC-SND1): Surface-mounted sanitary napkin disposal, 22 gauge stainless steel/satin finish.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-270 or comparable product by one of the following:

   a. American Specialties, Inc.
   b. Bradley Corp.
   c. Or approved equal.

G. Toilet Paper Dispenser (AC-TPD1): Surface-mounted toilet tissue dispenser and utility shelf, 20 gauge stainless steel/satin finish.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-2840 or comparable product by one of the following:

   a. American Specialties, Inc.
   b. Bradley Corp.
   c. Or approved equal.

H. Washroom Hook (AC-H1): Heavy-Duty Clothes Hook with Exposed Mounting, brass casting/satin nickel-plated finish.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-211 or comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corp.
c. Or approved equal.

I. Shower Seat ADA (AC-SS1): Reversible solid phenolic folding shower seat, solid phenolic with matte-finish/white.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment Co.; Model B-5181 or comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corp.
c. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 PREPARATION

A. Closely coordinate accessories that are to be partition mounted 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 that 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.

3.3 INSTALLATION

A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.

B. Securely anchor concealed anchor assemblies for gypsum drywall partitions to metal studs to accommodate accessories. Assemblies include plates and/or angles tack welded to studs.

C. Secure accessories in place, at their designated locations by means of theft-proof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.

D. Unless otherwise indicated, accessories must conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, install in locations as directed by the Commissioner.

E. Installed accessories must operate quietly and smoothly for use intended. Doors and operating hardware must function without binding or unnecessary friction. Key alike dispenser type accessories. Prior to final acceptance, give master key and one duplicate key to the Commissioner.

F. The Commissioner will be the sole judge of workmanship. Workmanship must 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. Install grab bars so that they can support a three hundred (300) lb. load for five minutes per ASTM F 446.

END OF SECTION 10 28 13

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 09 21 16 "Gypsum Board Assemblies"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

1.4 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.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHER CABINETS

A. Type and Style: Type 304 stainless steel with No. 4 finish, recessed, with plexiglass panel, sized to fit within the partition or wall depth. Provide fire rated cabinets within fire rated partitions.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Larsen's Mfg. Co.; Model G-2409-RT recessed, trimless, with Duo-Panel door or comparable product by one of the following:

1. J. L. Industries

2. Potter Roemer

3. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION

A. Install items included in this Section in locations indicated and at heights to comply with 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

SECTION 10 82 19 - EXTERIOR SOUND SCREENS

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 sound barrier wall system at exterior rooftop.

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data

C. Shop Drawings

1. Submit shop drawings showing layout, profiles and product components, including structural steel, anchorage, accessories, finish colors, patterns and textures.

2. Structural Calculations: Submit calculations certified by a Professional Engineer licensed in the State of New York demonstrating that the system will withstand wind loads as required by New York City Building Code.

D. Test Reports

1. Accelerated Weathering: Submit test report from a NVLAP accredited laboratory illustrating compliance with the requirements of this specification.

2. Corrosion Resistance: Submit test report from a NVLAP accredited laboratory illustrating compliance with the requirements of this specification.

E. Submit color charts for selection by Commissioner.

F. Quality Assurance Submittals

1. Certificates: Product certificates and literature signed by the manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

2. Manufacturer’s Instructions: Manufacturer’s installation and handling instructions.

G. Closeout Submittals

1. Warranty: Warranty documents specified herein

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Use adequate numbers of skilled workers who are 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.

C. Source Responsibility: Provide sound control panel system from a firm specializing in producing sound control products for a minimum of three (3) years.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

1.6 WARRANTY

A. Manufacturer's Warranty: Factory-applied finished shall be warranted against fading, chalking or cracking for 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOUND BARRIER WALL SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide IAC Acoustics; Noishield Barrier Wall System, Freestanding Barrier Type FS, or comparable product by one of the following:

1. Noise Barriers, a Division of Sound Seal

2. Empire Acoustical Systems

3. Or approved equal.

2.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Regulatory Requirements:

1. Sound Control Panels when tested in accordance with ASTM E90 shall have the following minimum Sound Transmission Loss values:

a. 1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	STC
Transmission Loss, dB	21	34	40	33	32	26	37	30

2. Sound Control Panels when tested in accordance with ASTM C423 shall have the following minimum sound absorption coefficients:

a. 1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	NRC
Absorption Coefficients	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

B. Structural: Galvanized steel panels shall be designed to withstand wind pressure as required by New York City Building Code without reinforcement.

2.3 COMPONENTS

A. Panel Materials: Panels shall be constructed of galvanized steel manufactured in accordance with the requirements of ASTM A924 coated to ASTM A653 specification. Panel components shall meet the following structural requirements:

1. Perforated Face Sheet: 20 gauge steel.

2. Solid Face Sheet: 14 gauge steel.

3. Solid End Caps: 18 gauge steel.

B. Acoustical Fill: Fill materials shall be fiberglass or mineral wool, non-corrosive, resistant to attack by fungus, fire-resistant, vermin proof and non-hygroscopic. Fill material shall be free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements. All materials shall have a Class A fire rating with a flame spread not greater than 25.

C. Bearing Blocks: Provide 1" thick x 2 1/4" wide x 4" long 65 durometer EPDM, neoprene or rubber bearing blocks to support bottom panel of wall system.

D. Steel Columns

1. Fabricated structural steel members shall be hot-dip galvanized after fabrication per ASTM A123. Factory prime and field paint surfaces exposed to view from public side to match barrier panel.

2. Steel for wide flange shapes and built-up column members shall conform to ASTM A992. All other structural steel base plates and braces shall conform to ASTM A36.

3. Anchor Bolts: ASTM A36 galvanized.

2.4 FABRICATION

A. Perforated and solid sheets shall be roll-formed in lengths up to twenty feet.

B. Panel shall be assembled to form a free draining module.

C. Solid inner and perforated outer panel sheets shall be joined together without the use of spot welds or mechanical fasteners. Internal reinforcement shall not be used.

D. Fabricate panels to be rigid, neat in appearance and free from defects, warp or buckle.

E. Panel assembly shall be designed so as to compress and hold the fill materials in place. Any voids in the panel fill will be unacceptable.

F. Panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer’s instructions.

2.5 FINISH

A. Powder Coating: After the panel is formed and before being packed with sound absorbing fill, factory finish utilizing an electrostatically applied polyester powder coating system to ensure complete panel, perforations, and edge coverage. The coating shall be thermally bonded to the surface of the galvanized steel. Finish coating shall have a dry film thickness of 3 mils (+/- 0.5 mils).

1. Color: As selected by Commissioner from manufacturer's standard available range.

B. Corrosion Testing: Panels shall have been tested for corrosion resistance in accordance with ASTM B117. After 2,400 hours of exposure the coating system shall not fail due to blistering, loss of adhesion, or corrosion along the score lines.

C. Accelerated Weathering Testing: Modules shall have been tested for accelerated weathering in accordance with ASTM G23. After 2,400 hours of testing, module samples shall not exhibit chalking less than No. 8 per ASTM D4214 or a color change greater than 5 NBS units per ASTM D2244.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Install in strict accordance with manufacturer's written instructions for specific installation conditions.

B. Anchor panels and other components of the work securely in place, with provisions for thermal and structural movement.

END OF SECTION 10 82 19

SECTION 114000 - FOODSERVICE 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 SCOPE

A. The work referred to in this section consists of furnishing all labor and material required to provide and install all equipment hereinafter specified into the building, uncrate, assemble, hang, set in place, level, and completely install, exclusive of final utility connections.

1.3 SUBMITTALS PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Furnish the Commissioner with reproducible copies of the following drawings, in accordance with the approved project schedule, which will be made on sheets equal in size and matching the bid set drawing size. Reproduced copies of bid documents will not be accepted for this purpose in any fashion.
   1. Equipment specified for fabrication will be detailed and fully dimensioned to a minimum scale of 3/4" = 1'-0" (1:20) for plan and elevation views and 1-1/2" = 1'-0" (1:10) for sections.
   2. Prepare separate electrical and mechanical dimensioned rough-in drawings at 1/4" = 1'-0" (1:50) showing exact point of penetration of floors, walls, and ceilings for all services required to operate the equipment that the Contractor will furnish, including the requirements for Contractor supplied and installed refrigerant and beverage piping line runs. These drawings will also show exact locations of final connections to equipment. Indicate floor drains, floor sinks, receptacles, lights, and other special conditions related to the equipment known to the Contractor but provided under other Sections.
   3. Dimensioned drawings will be submitted showing the location and size of all bases, depressions, grease interceptors, special height walls, openings in walls for equipment or operations, and critical dimensions, etc. Drawings will be drawn to a scale of not less than 1/4" = 1'-0" (1:50).

B. Manufacturers' Data: Submit bound copies of Manufacturers' Illustrations and Technical Data to the Commissioner for review prior to procurement. Items of Standard Manufacture will be submitted, including items purchased to be built into fabricated equipment. Each illustration will

be marked to describe accurately the item to be furnished as specified, including voltage, phase, load, accessories, etc.

C. Manufacturers' List: Submit in writing a list of all manufacturers' representatives of the foodservice equipment, such as convection ovens, ranges, etc., and their authorized service agencies' addresses and telephone numbers.

D. Foundation Data: Data and drawings will be submitted for each item, if any, requiring special foundations, structures, or supports. Such foundations, structures, or supports will be provided and installed by other appropriate trades in accordance with the drawings and specifications which will be provided by the Contractor and reviewed by the Commissioner.

E. Operation and Maintenance Manuals: Provide three bound copies of operation, maintenance, and parts manuals for all equipment items of standard manufacture including standard component assemblies built into all custom-fabricated items.

F. Review by the Commissioner of the drawings and brochures submitted by the Contractor does not waive the responsibility of the Contractor to furnish each item of equipment in complete compliance with the specifications and contract drawings.

G. The number of copies of all submittals will be as determined by the Commissioner.

H. Samples: Samples of materials, products, and fabrication methods will be submitted for review at no additional cost, before proceeding with the work.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Standard Products: Materials, products, and equipment furnished under this contract will be the standard items of manufacturers regularly engaged in the production of such materials, products, and equipment and will be of the manufacturers' latest design that complies with the specifications.

C. Manufacturers' Qualifications: Manufacturers will be regularly engaged in the production of the items furnished and will have demonstrated the capability to furnish similar equipment that performs the functions specified or indicated herein.

D. Installation Qualifications: Contractor will 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 defined in this Section.

E. Coordination of Work: Coordinate work with the respective trades performing preparatory work for installation of equipment under this Contract, including, but not limited to: construction of pits, trenches, receptors; rough-in of supply, waste and vent piping; electrical connections; and field verification of dimensions.

F. Product Options: Drawings indicate foodservice equipment based upon equipment specified herein.

G. Conflict: Where written specifications and drawings conflict or appear to conflict, request clarification.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver foodservice equipment in containers designed to protect equipment and finish until final installation. Make arrangements to receive equipment at project site at a time and place agreed with the General Contractor. If the site is not ready for delivery, then either delay delivery or arrange to hold in a secure and protected warehouse until delivery can be made to job site.

B. Store foodservice equipment in original containers and in location to provide adequate protection to equipment while not interfering with other construction operations. Coordinate with other trades so that worktables, serving counters and equipment are not used for scaffolding or as workbenches.

C. Handle foodservice equipment carefully to avoid damage to components, enclosures, and finish. Do not install damaged foodservice equipment; replace and return damaged components to equipment manufacturer.

1.7 APPLICABLE CODES AND STANDARDS

A. Except as otherwise indicated, each item of equipment will comply with the latest current edition of the following standards as applicable to the manufacture, fabrication, and installation of the work in this section. Comply with all Federal, State, and Municipal regulations and notifications which bear on the execution of this work. Call to the attention of the Commissioner in writing any design conflict with the requirements of the USDOJ's 2010 ADA Standards for Accessible Design and ICC A117.1-2009.
   1. NSF Standards: Comply with applicable National Sanitation Foundation standards and criteria and provide NSF "Seal of Approval" on each manufactured item and on major items of custom-fabricated work.
   2. UL / ETL / CSA Standards: For electrical components and assemblies, provide either UL / ETL / CSA listed products or, where no listing service is available, provide a complete index of the components used as selected from the UL / ETL / CSA "Recognized Component Index." For fire extinguishing systems comply with UL 300.
   3. ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning equipment; for piping to compressed-gas cylinders; and for plumbing fittings, including vacuum breakers and air gaps, to prevent siphonage in water piping.
   4. AGA / CGA: All gas-fired equipment will be AGA / CGA approved, equipped to operate on the type gas available at the job site, and will contain 100% automatic safety shut-off devices.
   5. NFPA Standards: Comply with NFPA Bulletin 96 for exhaust systems; with NFPA Bulletins 13, 17, 17A and 96 for fire extinguishing systems; and with NFPA 54, National Fuel Gas Code and NFPA 70, National Electrical Code.
   6. ASME Code: Comply with ASME boiler code requirements for steam-generating and steam-heated equipment; provide ASME inspection, stamps, and certification of registration with National Board.
   7. SMACNA Guidelines: Provide seismic restraints for food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA)

"Kitchen Equipment Fabrication Guidelines", appendix 1, "Guidelines for Seismic Restraints of Kitchen Equipment", unless otherwise indicated.

8. ASHRAE: Provide mechanical refrigeration systems complying with the American Society of Heating, Refrigerating and Air Conditioning Engineers' ASHRAE 15, "Safety Code for Mechanical Refrigeration".

1.8 PROJECT CONDITIONS

A. Visit the job site to field check actual wall dimensions and roughing-in and be responsible for furnishing, fabricating, and installing the equipment in accordance with the available space and utility services as they exist on the job site for an accurate fit.

B. Check all door openings, passageways, elevators, etc., to be sure that the equipment can be conveyed to its proper location within the building and, if necessary, check with other trades regarding the possibility of holding wall erection, placement of doorjambs, windows, etc., for the purpose of moving the equipment to its proper location. Any removal and rebuilding of walls, partitions, doorjambs, etc., necessary to place the equipment will be done at the expense of the Contractor.

C. Physically check the location and utility size of all "rough-ins" at the job site for compatibility with the equipment being installed before finished floors, walls, and/or ceilings are in place.

D. Check electrical characteristics and water, steam, and gas pressure. Provide pressure-regulating valves where required for proper operation of equipment.

1.9 GUARANTIES AND WARRANTIES

A. Self-contained or remote refrigeration systems furnished under this Contract will be provided with start-up and a one-year manufacturer's warranty and guarantee service. Warrant the compressors with the manufacturer's five-year warranty. Hermetic or semi-hermetic compressors will be covered by the manufacturers' factory warranty for an additional four years. Other equipment provided will include a one-year warranty covering parts and labor, plus any warranties as normally provided by individual manufacturers. Equipment including refrigeration systems both self-contained and remote will be warrantied by the Contractor on the project for one year.

PART 2 – PRODUCTS

2.1 GENERAL

A. The equipment and its component parts will be new and unused. All items of standard manufactured equipment will be current models at the time of delivery. Parts subject to wear, breakage, or distortion will be accessible for adjustment, replacement, and repair.

B. Ensure adequate lubrication for moving parts. Oil holes, grease fittings, and filler caps will be accessible without the use of tools.

C. Plastic nameplates, to identify controls on fabricated equipment and when specified elsewhere, will be provided of two-ply, 1/16" (2 mm), rigid plastic material which will be specifically manufactured for engraving such nameplates. The finished nameplate will be machine engraved with white letters on a black background and will have edges beveled at a 45° angle. Nameplates will be attached using an adhesive recommended by the manufacturer of the engraved material.

D. The design of the equipment will be such as to provide for safe and convenient operation. Covers or other safety devices will be provided for all items of equipment presenting safety hazards. Such guards or safety devices will not present substantial interference to the operation of the equipment. Guards will provide easy access to guarded parts.

E. Trim will not be an acceptable substitute for accuracy and neatness. When trim is required and accepted by Commissioner in lieu of rejection of items of equipment, it will be the Contractor's responsibility to provide same at no additional cost.

F. Unless otherwise specified herein, no material lighter than #20 gauge will be incorporated into the work. Gauges for sheet iron and sheet steel will be U.S. Standard Gauges and finished equipment gauge thickness will not vary more than 5% plus or minus from the thickness indicated below.

GAUGE	THICKNESS	GAUGE	THICKNESS
#10	0.1406” (3.0mm)	#16	0.0625” (1.6mm)
#12	0.1094” (2.5mm)	#18	0.0500” (1.25mm)
#14	0.0781” (2.0mm)	#20	0.0375” (1.0mm)

G. Materials or work described in words which have a well-known and accepted technical or trade meaning will be held to refer to such accepted meanings.

2.2 MATERIALS

A. Submit a certified copy of the mill analysis of materials if requested by the Commissioner.

B. Stainless steel sheets will conform to American Society for Testing and Materials (ASTM), specification A240, Type 304 Condition A, 18-8, having a No. 4 finish. A No. 2B finish will be acceptable on surfaces of equipment not exposed to view. Sheets will be uniform throughout in color, finish, and appearance.

C. Stainless steel tubing and pipe will be Type 304, 18-8, having a No. 4 finish, and will conform to either ASTM A213 if seamless or ASTM A249 if welded.

D. Rolled shapes will be of the cold-rolled type conforming to ASTM A36.

E. Galvanized sheet steel will conform to ASTM A526; where extensive forming to take place, conform to ASTM A527; conform to ASTM A525, coating designation G115, chemical treatment.

F. Galvanized steel sheets will be cold-rolled, stretcher leveled, bonderized, and rerolled to ensure a smooth surface.

G. Castings will be corrosion-resisting metal containing not less than 30% nickel. Castings will be rough ground, polished, and buffed to bright luster and free from pit marks, runs, checks, burrs, and other imperfections. In lieu of corrosion- resisting metal castings, die-stamped or cast 18-8 stainless steel will be acceptable.

H. Sealant: ASTM C 920; type S, Grade NS, Class 25, use, NT. Provide elastomeric sealant, NSF certified for end use application indicated. Provide sealant that, when cured and washed, meeting requirements of Food and Drug Adminstration's 21 CFR, Section 177.2600 for use in areas that come in contact with food. Clear or approved color to match surrounding surfaces and applied in accordance with sealant manufacturers' recommendations for smooth, sealed finish.

I. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Class 1 (clear), Quality q3 (glazing select). Provide products complying with ANSI Z97.1, manufactured by horizontal (roller hearth) process and ¼" (6 mm) thick, unless otherwise indicated. Provide exposed safety edges, if any, seamed before tempering.

J. Sound Dampening: NSF-certified, nonabsorbant, hard-drying, sound deadening coating. Provide coating compounded for permanent adhesion to metal in 1/8" (3 mm) thickness that does not chop, flake, or blister.

2.3 FINISHES

A. Paint and coatings will be of an NSF approved type suitable for use in conjunction with foodservice equipment. Such paint or coating will be durable, non-toxic, non-dusting, non-flaking, and mildew resistant; will comply with all governing regulations; and will be applied in accordance with the recommendations of the manufacturer.

B. Exterior, galvanized parts, exposed members of framework, and wrought steel pipe where specified to be painted will be cleaned, properly primed with rust-inhibiting primer, degreased, and finished with two (2) coats of epoxy-based grey hammertone paint, unless otherwise specified.

C. Stainless steel, where exposed, will be polished to a #4 commercial finish. Where unexposed, finish will be #2B. The grain of polishing will run in the same direction wherever possible. Where surfaces are disturbed by the fabricating process, such surfaces will be finished to match adjacent undisturbed surfaces.

D. Galvanized shelving will not be painted.

E. Fabricated equipment will be spray coated with plastic suitable for protecting the equipment during transport and installation. The coating will be easily removable and will be removed after the equipment installation is complete at the work site or, alternatively, when directed by the Commissioner.

F. Exposed surfaces on brass, bronze, or steel will be plated with chromium over nickel in accordance with Federal Specifications WW-P-541, Paragraph 9.5 and Table 9.4, unless otherwise specified.

2.4 ELECTRICAL AND MECHANICAL REQUIREMENTS

A. Standard UL / ETL / CSA listed materials, devices, and components will be selected and installed in accordance with NEMA Standards and recommendations and as required for safe and efficient use and operation of the foodservice equipment without objectionable noise, vibration, and sanitation problems.

1. Provide recognized commercial grade signals, "on-off" pushbuttons or switches, and other speed and temperature controls as required for operation of each item, complete with pilot lights and permanent engraved, plastic laminate signs and graphics identifying each item. Provide stainless steel cover plates at controls and signals.
2. Each item requiring electrical power will be equipped with either a terminal box for permanent connection or with cord and plug for interruptable connection, as indicated. Provide NEMA standard grounding type plugs, where used.
3. Furnish foodservice equipment completely wired internally using wire and conduit suitable for a wet location, including a separate grounding wire. Provide electrical outlets and receptacles required to be mounted on or in fabricated equipment and interconnect to a suitable terminal box (sub-panel, starter, or disconnect switch if so specified) with all wires neatly tagged showing item number, voltage characteristics, and load information.
4. Receptacles for all wall- and floor-mounted outlets will be provided to be used for plug-in equipment with characteristics as noted on the drawings. Provide Hubbell three-wire or four-wire grounding-type connectors and neoprene cords installed on each item of plug-in equipment to match receptacles provided.
5. Electrically heated equipment will be internally wired to a thermostatic control and an "on-off" red neon light indicator, which will be mounted in a terminal box on a removable stainless steel access panel.
6. Only rigid steel zinc-coated conduit will be used, painted to match adjacent surfaces where exposed. Wiring will be run concealed wherever possible.
7. Provide on, or for, each motor-driven appliance or electrical heating or control unit, a suitable control switch or starter of the proper type and rating.
8. Appliances will be furnished complete with motors, driving mechanism, starters, and controllers, including but not limited to, master switches, timers, cut-outs, reversing mechanism, and other electrical equipment if and as applicable. Wiring and connection diagrams will be furnished with electrically operated machines and for electrically wired fabricated equipment.
9. Appliances will be of rigid construction, free from objectionable vibration. Quietness of operation of all foodservice equipment is a requirement. Remove or repair any equipment producing objectionable noise and/or vibration as directed by the Commissioner.
10. Motors will be of the drip-proof, splash-proof, or totally enclosed type, having a continuous duty cycle and ball bearings, except small timing motors which may have sleeve bearings. Motors will have windings impregnated to resist moisture. Motors located where subject to deposits of dust, lint, or other similar matter from the machine on which installed will be of the totally enclosed type. Motors will have ample power to operate the machines for which designated under full load operating conditions without exceeding their nameplate ratings. Horsepower requirements on equipment will be determined by the manufacturer, based on normal operation at maximum capacity. The nominal rated motor horsepower will be not less than the horsepower required for normal operation of the equipment at maximum capacity. Insulation will be NEMA Class B, or better.
11. Cover plates will be furnished and installed for all electrical outlets, receptacles, switches, etc., to match the material and finish of the equipment to which they will be fastened.

12. Switches, controls, etc., will be conspicuously labeled as to use with plastic nameplates secured to the adjacent surface as previously specified in Article 2.01-C. Submit a sample for approval if requested by Commissioner.
13. Where specified for custom fabricated equipment, provide compartment with electrical sub-panel which will be pre-wired in conduit concealed in cabinet body construction and connected to all electrical components built into or set upon the counter. Electrical sub-panel will be UL / ETL / CSA listed, 3-phase, 4-wire circuit breaker type with a ground buss main breaker and individual breakers for each serviced load. Buss will be copper and the circuit breakers will be the molded case, bolt-on type with thermomagnetic quick-make, quick-break trip. Multi-pole circuit breakers will have an internal trip bar. The circuit breakers will have an interrupting capacity of 10,000 amperes at 120 volts and there will be a separate breaker for each connected load. Each breaker will be sized for 125% of the connected load and a minimum of two (2) extra, single pole, 20 amp circuit breakers will be provided. The loads will be connected through the breakers in a phased sequence to balance the load on each phase.

B. Water inlets will be located above the positive water level wherever possible to prevent siphoning of liquids into the water supply system. Wherever conditions will require a submerged inlet, a suitable type of check valve (except in jurisdictions where check valves are prohibited) and vacuum breaker will be provided with the fixture to prevent siphoning. Where exposed, piping and fittings will be chrome-plated. Where vacuum breaker piping is through equipment, provide chrome -plated escutcheon plates to cover holes.
   1. Provide and install indirect waste lines from equipment which will discharge into floor drains or safe wastes, chrome-plated where exposed. Extend to a point at least 1" (25 mm) above the rim of the floor drain, cut bottom on 45-degree angle and secure in position.
   2. Horizontal piping lines will be run at the highest possible elevation and not less than 6" (150 mm) above the floor, through equipment where possible.
   3. No exposed piping in or around fixtures or in other conspicuous places will show tool marks or more than one thread at the fitting.
   4. Steam operating valves on or in fabricated and purchased foodservice equipment will be provided with composition hand wheels, which will remain reasonably cool in service.

C. Provide and install complete refrigeration systems--charged, started, and operating properly--including, but not limited to:
   1. Where specifications call for pre-piped lines (i.e., from a fixture to a valve compartment, etc.), provide such work in strict conformance with other sections of the specifications which set forth standards for this type of work or in conformity with the requirements of the ASHRAE Standards.
   2. Mechanically refrigerated cold pans will have a normally closed liquid line electric solenoid valve installed before the expansion valve and wired to a silent-type toggle switch complete with an "on-off" red neon light indicator and both mounted in a terminal box on a removable access panel. This switch will be fed by a separate control circuit and will not to be wired into the compressor circuit so that it will stop the flow of refrigerant to the cold pan and not turn off the compressor. The compressor will then pump down and turn off through the action of the pressure control.
   3. Each refrigeration item specification is written to provide minimum specifications and scope of work. Refrigeration equipment will be designed and installed to maintain the following general temperatures unless otherwise specified.

a. Refrigerators	1.7°C / 35°F
b. Freezers	-23.3°C / -10°F
c. Cold Pan	-17.8°C / 0°F
d. Work Rooms	10°C / 50°F

4. Provide electrical and refrigeration components needed by the completed system and complete all refrigeration and control connections of and to said components.
5. Provide evaporator coil defrost system on all walk-in refrigerator and freezer rooms where the refrigeration systems are designed to operate at room temperature of less than 35°F (1.7°C).
6. Verify the requirements of and provide any or all additional refrigeration specialty(s) or component(s) required or recommended by the manufacturer for proper operation under the specific operating conditions and location of each system specified.
7. Verify and provide manufacturer's certification (or certification by manufacturer's authorized agent) that the equipment selection hereinafter specified for each refrigeration system is properly sized and will meet the operating requirements set forth for each system regarding maintaining specified operating temperature, hours of compressor running time, and system pressures and velocities as recommended by the equipment manufacturer(s).
8. During check-out and initial operation, verify that:
    a. Controls are properly adjusted.
    b. Condensers are equipped with an overload protector.
    c. Competent service mechanic is on site during the first eight (8) hours of operation.
    d. Switches, starters, and controls are identified as to function.
9. Unless otherwise specified, furnish thermometers for walk-in units mounted above the exterior entrance door with suitable length armored capillary tubes to allow the sensing bulbs to be installed in the incoming air stream to the blower coil with runs fastened to the walk-in walls to prevent it from damage. This identical requirement applies to alarm systems when specified.

2.5 PRODUCT SPECIFICATIONS

A. Refer to Part 4 for complete itemized product specifications.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Begin installing the equipment at the time the building is ready to receive the equipment and in accordance with the schedule.

B. Provide a competent foreman or supervisor for erection of equipment and to coordinate with other trades regarding connections, installation, and inspection. Coordinate delivery schedule to ensure adequate openings in the building to receive the equipment.

C. Install refrigeration work in an approved manner, using first quality fittings, controls, valves, etc. Refrigeration items will be started up, tested, adjusted, and turned over to the Commissioner in first-class condition and left operating in accordance with the manufacturer's specifications.

D. Set equipment that rests on masonry bases, level onto a bed of silicone rubber sealant.

E. Seal equipment that butts to a wall or against other equipment with silicone rubber sealant. Set trim strips or other items requiring fasteners in a bed of silicone rubber sealant and fastened with suitable stainless steel fasteners 48" (1200mm) or less on centers. Thoroughly clean and degrease all surfaces prior to the application of sealant.

F. Install and interconnect electrical controls, switches, or other units which are separately furnished for field installation in or on equipment provided, unless otherwise specified.

G. Install and wire refrigeration systems in strict conformance with the manufacturers' instructions and recommendations. Ensure that all refrigeration condensing units are ventilated properly and are accessible for repair, maintenance, and inspection.

H. Hang evaporator coils per the manufacturer's recommendation at the locations as shown on the drawings. Mount units such that the drain pans are pitched to the drain lines. Hang the coils using nylon or other approved non-conductive, non-corrosive fasteners. Furnished #12 gauge galvanized steel fishplates of suitable size and shape on the exterior ceiling of the walk-in to spread the weight of the coils adequately. Connect coils to the condensing unit and install to constitute a complete working system capable of maintaining the interior temperatures specified regardless of the heavy usage the walk-in units may receive.

I. Furnish and install a copper or PVC drain line painted silver from each coil outlet to a point 1" (25mm) above the floor drain. Trap drain lines immediately above the floor drain. Provide continuous electrified heater tape for freezer drain lines, coordinate electrical requirements and wiring with electrical division. Insulate drain line after installation.

J. Refrigeration tubing will be the Type L, ACR hard drawn degreased, sealed copper and will be installed with horizontal runs sloped 1" per 20 feet (1:240) toward the condensing units. Refrigerant

piping will be properly supported by adjustable hangers spaced and adjusted to the drop required. Where vertical runs of more than 5' (1500mm) occur in the suction line, trap the risers at the bottom. Install piping so that refrigerant or oil cannot drain back into the coils from the suction line.

K. Insulate suction and refrigerant lines with minimum 1/2" (13mm) cellular type insulation. Provide metal pipe sleeves where piping passes through a wall, ceiling, or floor. Fill space around the tubing with mastic insulating compound. Install a permanent suction line filter in each compressor suction line with pressure fitting ahead of the filter to facilitate checking of pressure drop through the filter. Fully insulate and seal penetrations through walk-in cooler or freezer structures to be vapor tight to prevent condensation within any light fixtures, switch boxes, junction boxes, or any other fittings. Fully seal refrigeration and drain lines and provide escutcheon plates.

L. Furnish and completely install a thermostat to control the refrigeration temperatures for each individual compartment.

M. Mount the condensing units on a welded steel rack containing all accessories and components necessary to form a complete condensing unit package. Provide each condensing unit with a factory mounted, pre-wired control panel/disconnect switch complete with circuit breakers, contactors, and time clocks as required.

N. Furnish four (4) copies of complete remote refrigeration system control wiring and piping diagrams. Frame one (1) copy in Plexiglas and mount at compressor location or inside the refrigeration system enclosure as appropriate.

O. Coordinate the equipment work with the respective work of other Sections so that electrical and mechanical components built into the equipment will conform and/or adapt to the type, materials, and characteristics of the building components.

P. Install heated and motor-driven equipment so as to operate efficiently. Provide additional vents, guards, deflectors, and other accessories as needed at no additional cost. Note such additions or modifications on the shop drawings and bring to Commissioner's attention by special accompanying letter.

3.3 FABRICATION

A. Items of fabricated equipment will be fabricated in the same factory and will be similar in construction details, materials, methods, and appearance to similar types of items so fabricated under this contract.

B. Each fabricated item of equipment will include necessary reinforcing, bracing, and welding with the proper number and spacing of uprights and cross members for strength. Wherever standard sheet sizes will permit, the tops of all tables, shelves, exterior panels of cabinet type fixtures, and doors and drain boards will be constructed of a single sheet of metal. Except where required to be removable, flat surfaces will be secured to vertical and horizontal bracing members by welding or other approved means to eliminate buckle, warp, rattle, and wobble. Equipment not braced in a rigid manner and which is subject to rattle and wobble will be unacceptable, and the Contractor will add additional bracing in an approved manner to achieve acceptance.

C. Suitable pipe slots will be provided on fabricated equipment to accommodate service and utility lines and mechanical connections. These slots will be of proper size and will be neatly made with turned up edges around to eliminate cutting or defacing of equipment on the job. Cabinet bases will be provided with an inner panel duct at the ends or rear of the cabinet allowing adequate space to conceal vertical piping. Such work, when performed at the job site, will be of the same quality as similar work performed in the shop.

D. Exposed surfaces will be free from bolt and screw heads. When bolts are required, they will be of the concealed type and be of similar composition as the metal to which they are applied. Where bolt or screw threads on the interior of fixtures are visible or may come into contact with hands or wiping cloths, they will be capped with a stainless steel acorn nut and stainless steel lock washer.

E. Where screw threads are not visible or readily accessible, they will be assembled with stainless steel lock washers and nuts. Wherever bolts or screws are welded to the underside of trim or tops, the reverse side of the weld will be finished uniformly with the adjoining surfaces. Depressions at these points will not be acceptable.

F. Rivets will not be permitted in any location.

G. Welding will be the heliarc method with welding rod of the same composition as the sheets or parts welded. Welds will be complete, strong, and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds will be free of mechanical imperfections such as gas holes, pits, cracks, etc., and will be continuously welded so that the fixtures will appear as one piece construction. Butt welds made by spot solder and finished by grinding will not be acceptable.
   1. Spot welds will have a maximum spacing of 3" (75mm). Tack welds will be of at least 1/4" (6mm) length of welding material at a maximum space of 4" (100mm) from center to center. Weld spacing at the ends of the channel battens will not exceed 2" (50mm) centers.
   2. In no case will soldering be accepted.
   3. Fixtures will be shop fabricated of one piece and shipped to the job completely assembled wherever possible. Equipment too large to transport or enter the building as one piece will be constructed so that the field joints can be welded at the job site.
   4. Exposed joints will be ground flush with adjoining material and finished to harmonize therewith. Whenever material has been depressed by a welding operation, such depression will be suitably hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots. In all cases, the grain of rough grinding will be removed by successive fine polishing operations.
   5. Unexposed welded joints on under shelves of tables or counters in stainless steel construction will be suitably coated at the factory with an approved metallic-based paint.
   6. After galvanized steel members have been welded, welds and areas where galvanizing has been damaged will have a zinc dust coating applied in conformance with U.S. Government Military Specification Number MIL-P-26915.

H. Butt joints and contact joints, wherever they occur, will be close fitting and will not require a filler. Wherever break bends occur, they will be free of undue extrudence and will not be flaky, scaly, or cracked in appearance; where such breaks do mar the uniform surface appearance of the material, such marks will be removed by suitable grinding, polishing, and finishing. Wherever sheared edges occur, they will be free of burrs, fins, and irregular projections and be finished to

obviate danger of cutting or laceration when the hand is drawn over them. In no case will overlapping materials be acceptable where miters or bull nosed corners occur.

I. The grain of polishing will run in the same direction on horizontal and on vertical surfaces of each item of fabricated equipment except in the case where the finish of the horizontal sections of each will terminate in a mitered edge. Where sinks and adjacent drain boards are equipped with backsplash, the grain of polishing will be consistent in direction throughout the length of the backsplash and sink compartment.

J. Component parts, whether fabricated by the Contractor or purchased for building into the fabricated equipment, will conform to the following.

K. Bolts, screws, nuts, and washers will be of steel, except where brass or stainless steel is fastened, in which case they will be of brass or stainless steel, respectively. Where dissimilar metals are fastened, bolts, screws, nuts, and washers will be of the higher grade metal. The spacing and extent of bolts and screws will be such as to ensure suitable fastening and prevent buckling of the metals fastened.

3.4 CLEAN-UP

A. At completion of the installation, clean up, lubricate, and adjust where necessary items of equipment provided and turn them over in first-class condition.
   1. Where stainless steel surfaces are disturbed by the installation or fabricating process, such surface will be finished to match adjoining undisturbed surfaces.
   2. At the completion of the installation work, stainless steel will be gone over with a portable polishing machine and buffed to perfect surfaces. Painted surfaces will be carefully gone over and retouched as required.

3.5 START-UP TESTING AND TESTING

A. Startup Services: Engage factory-authorized service representatives to perform startup services and to demonstrate and instruct facility’s maintenance personnel as specified below.
   1. Coordinate food service equipment startup with service-utility testing, balancing, and adjustments. Do not operate steam lines before they have been cleaned and sanitized.
   2. Remove protective coverings and clean and sanitize equipment, both inside and out, and relamp equipment with integral lighting. Where applicable, comply with manufacturer's written cleaning instructions.
   3. Test each equipment item for proper operation. Repair or replace equipment that is defective in operation, including units that operate below required capacity or that operate with excessive noise or vibration.
   4. Test refrigeration equipment's ability to maintain specified operating temperature under heavy-use conditions. Repair or replace equipment that does not maintain specified operating temperature.
   5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   6. Test motors and rotating equipment for proper rotation and lubricate moving parts according to manufacturer's written instructions.

7. Test water, drain, gas, steam, oil, refrigerant, and liquid-carrying components for leaks. Repair or replace leaking components.
8. Instruct facility's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance for each food service equipment item.
9. Review data in the operation and maintenance manuals.
10. Schedule instruction with facility, through Commissioner, with at least 7 days' advance notice.

PART 4 - ITEMIZED PRODUCT SPECIFICATIONS

4.1 SPECIFIER IDENTIFICATION SYSTEM

A. Each model number includes the code *C088 as a suffix. This code is known as the Specifier Identification System. It is not to be removed. Its purpose is to identify to the vendors providing equipment in the event it is necessary to communicate questions, clarifications, and comments. It is to be used on all correspondence including fax and email when communicating with manufacturer representatives and factories.

B. All items listed on the contract drawings under the heading "Foodservice Equipment Schedule" will be furnished in strict accordance with the foregoing specifications and with the following detailed item specifications

4.2 ITEMIZED FOODSERVICE EQUIPMENT SCHEDULE

A. Hand Sink Items 1.01 and 4.01 *C088

1. Underbar Hand Sink Unit, free standing, 12"W x 22-1/4"D, 6" backsplash, 10" wide x 14" front-to-back x 9-1/4" deep sink, splash mount faucet, 16 oz. pump soap dispenser, C-fold paper towel dispenser on front apron, sound-deadened underside, (1) 8-1/2" standpipe, 1-1/2" NPS male drain, stainless steel construction, stainless steel legs with adjustable thermoplastic feet, NSF
2. Basis of Design Product: Subject to compliance with requirements, provide Perlick TS12HSN-STK or comparable product by one of the following:
    a. Glastender
    b. Krowne
    c. Or approved equal

B. Ice Maker with Bin Item 1.02 *C088

1. Undercounter Ice Maker With Bin, cube style, air cooled, 20" width, contained condenser, production capacity up to 100 lb/24 hours at 70°/50° (80 lb AHRI certified at 90°/70°), 57 lb bin storage capacity, clear medium cube, horizontal evaporator, ADA compliant with floor mount kit, no side clearance required, 6" legs included, ice scoop included, R-134a refrigerant, includes power cord with NEMA 5-15P plug, 115V/60/1-ph, 6.4 amps, cETLus, ETL-Sanitation, CE

2. Basis of Design Product: Subject to compliance with requirements, provide Scotsman CU0920MA-1 or comparable product by one of the following:
    a. Hoshizaki
    b. Manitowoc
    c. Or approved equal

C. Water Filter, Ice Item 1.03 *C088

1. Water Filtration System, single system, 2.1 gallons per minute max flow, designed for cubers up to 650 lb, and for flakers, nuggets & nugget dispensers up to 1,200 lb, cULus, NSF. Provide Water Filter Replacement cartridge
2. Basis of Design Product: Subject to compliance with requirements, provide Scotsman AP1-P or comparable product by one of the following:
    a. Everpure
    b. 3M
    c. Or approved equal

D. Chemical Storage Cabinet with Sink Item 1.05 and Item 4.04 *C088

1. Chemical Storage Cabinet, 12" W, with sink less faucet, cabinet base with removable dump box, water tight pan, quick disconnect spray hose, stainless steel exterior & 6" backsplash
    a. 6" Backsplash standard
    b. Front Loading Faucet, wall/splash mount, lead free, gooseneck spout, faucet valves includes: built-in check valves to prevent back flow or across flow, (2) 3/8" O.D. x 3/8" O.D. x 18", braided stainless steel supply lines included
2. Basis of Design Product: Subject to compliance with requirements, provide Perlick 7057-3 or comparable product by one of the following:
    a. Glastender
    b. Krowne
    c. Or approved equalv

E. Glasswasher Item 1.06 *C088

1. Underbar Glasswasher, door type, 24"W, high-temperature sanitizing, built-in 5.3 kW booster heater, (30) 20" x 20" racks per hour, 11-1/4" maximum glass height, top-mounted controls, digital LED temperature gauges, rotating upper & lower rinse arms, removable front & side panels, stainless steel construction, 6" adjustable legs, 1 HP pump, 208v/60Hz/1-ph, 33.0 amps, cULus, NSF, ENERGY STAR.
    a. Provide drain water tempering kit
2. Basis of Design Product: Subject to compliance with requirements, provide Perlick PKHT24 or comparable product by one of the following:
    a. Champion
    b. Hobart

c. Or approved equal

F. Espresso Cappuccino Machine Item 1.10 *C088

1. A200 FoamMaster Premium Class Coffee Machine, (2) grinders, (2) 1.3 lbs. bean hoppers, 1 gallon milk container with integrated temperature sensor & docking system, 4.3" touch screen with intuitive menu, milk pumping system with temperature control, hot foam/hot milk, cold foam/cold milk, automated CleanMaster cleaning program, hot water wand, drip tray, integrated water tank, matte gray and black finish, 100-120v/60/1-ph, 1LN-PE, 15.0 amps, 1.45kW, cETLus, ETL-Sanitation (SPECIAL ORDER)
   a. Refrigeration
      i. Installation Kit, includes: water hose and BSP connector, technical support sticker, water hardness test strip, MSDS sheets for cleaning tablets and milk cleaner (included in installation cost)
      ii. Water filtration kit (includes Mavea C300 filter cartridge, filter head, fittings, water test kit).(required if using a plumbed water line vs. the integrated water tank)
      iii. Cleaning tablets (qty: 100 tablets = 100 cleanings)
      iv. Milk detergent, 1 liter bottle (3 months of cleanings)
2. Basis of Design Product: Subject to compliance with requirements, provide Franke A200 FM or comparable product by one of the following:
   a. La Cimbali
   b. WMF
   c. Or approved equal

G. Coffee Brewer Item 1.11 *C088

1. Coffee Brewer, single, automatic, for 1 gallon servers, with BrewWISE & smartWAVE sprayhead technology, 4.3" touchscreen, programmable digital display, USB port, wireless interface, energy-saver mode, electronic funnel lock, stainless steel finish, 4" satin nickel legs, 3.5 kW, 120/240v/60/1-ph, 14.6 amps, UL, NSF
   a. Server with Mechanical Sight Gauge, with base & drip tray, 1 gallon, lever action dispensing, brew-through lid, portable, soft-grip bail handle, fast flow faucet, aluminum faucet guard, vacuum insulated, stainless steel liner, black finish, for use with twin or single Infusion Series brewers, NSF
2. Basis of Design Product: Subject to compliance with requirements, provide Bunn 54300.0100 with 44000.0200 TF or comparable product by one of the following:
   a. Fetco
   b. Curtis
   c. Or approved equal

H. Water Filtration System Item 1.16 *C088

1. High Flow CSR Twin-MC2 System, for combination coffee brewers, fountain, ice & steam, 18,000 gallon capacity, 3.34 gpm flow rate, 0.2 micron rating, (2) MC 0.2 micron precoat Cartridges (1) SRX scale reduction feeder (1) EC210 pre-filter, water shut-off, pressure gauges, flushing valve
    a. Note: This system requires (2) cartridges, (1) pre-filter & (1) scale reduction feeder.
2. Basis of Design Product: Subject to compliance with requirements, provide Everpure EV933042 or comparable product by one of the following:
    a. 3M
    b. Antunes
    c. Or approved equal

I. Three-Compartment Sink Item 1.17 *C088

1. Underbar Sink Unit, three compartment, 36"W x 18-9/16"D, 6"H backsplash, 10" wide x 14" front-to-back x 9-1/4" deep compartments, 4" OC splash mount faucet holes, apron on front & sides, sound-deadened underside, includes 1-1/2" drains & 8-1/2" removable overflow standpipes, stainless steel construction, stainless steel legs with adjustable thermoplastic feet, NSF
    a. 934-10LF - Front Loading Faucet, wall/splash mount, lead free, 10" swing spout, faucet valves include built-in check valves to prevent back flow or cross flow, two (2) 3/8" O.D. x 3/8" O.D. x 18" braided stainless steel supply lines included
2. Basis of Design Product: Subject to compliance with requirements, provide Perlick TS33C or comparable product by one of the following:
    a. Glastender
    b. Krowne
    c. Or approved equal

END OF SECTION 114000

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SECTION 11 61 33 – RIGGING SYSTEMS AND 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. Pipe grids.

B. Related work:
   1. Theatrical Lighting Controls, Division 26 09 61
   2. Integrated Audio-Video Systems and Equipment, Division 27 41 16
   3. Heating Ventilation and Air Conditioning, Division 23
   4. Fire Suppression, Division 21

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Shop drawings shall include the following:
   1. Scale plans and elevations.
   2. Assembly drawings of all major components. Drawings shall include dimensions, weights, and bills of materials. Drawings shall show the construction and capacity of each component, and the loads imposed on the building structure.
   3. Finishes.
   4. Field survey information and dimensions.
   5. Estimated live and dead loads.

B. Shop drawings shall be stamped by a structural engineer licensed in the State of New York.

C. Catalog information for standard equipment, such as termination hardware, may be submitted instead of shop drawings, if applicable.

D. Upon completion of the installation, provide 1 reduced set of the shop drawings in a 3-ring binder for the Commissioner. In addition, provide an electronic copy of the shop drawings for the Commissioner.

E. Provide 1 hard copy of an instruction and maintenance manual. In addition, provide electronic copies of the manual for the Commissioner. The manual shall include:

1. System description.
2. Operation instructions, including safety measures.
3. Maintenance instructions, including recommended procedures and schedules for inspecting system components.
4. Catalog cuts for all purchased equipment

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Syracuse Scenery & Stage Lighting
syracusescenery.com

2. Texas Scenic
texasscenic.ocm

3. iWeiss
Iweiss.com

4. Or approved equal

C. All equipment shall be manufactured and installed in accordance with the applicable standards of the following organizations:

1. American Iron and Steel Institute (AISI).
2. American National Standards Institute (ANSI).
3. American Society of Mechanical Engineers (ASME).
4. American Society for Testing and Materials (ASTM).
5. American Welding Society (AWS).
6. Entertainment Services and Technology Association (ESTA).
7. Industrial Fasteners Institute (IFI).
8. International Organization for Standardization (ISO).

1.6 WARRANTY

A. Warrant the equipment in this Section to be free of defects in materials and workmanship for a period of 3 years from Substantial Completion.

PART 2 - EQUIPMENT

2.1 FINISHES

A. Metal parts shall be free from rust, scale, dirt, and welding spatter. All weldments or other metal components shall receive a coat of corrosion resistant primer prior to finish coating and component assembly.

B. Finish coat shall be flat alkyd enamel. Color shall be black.

2.2 PIPE GRIDS

A. Pipe grids shall consist of 1-1/2 inch nominal diameter standard weight (Schedule 40) pipe connected with clamps.

B. Pipe grid connection clamps: subject to compliance with requirements, provide one of the following:

1. JR Clancy: Cross Grid Connectors
2. IWeiss: Intersection Bracket
3. IA Stage: SkyTies
4. Or approved equal.

C. Pipe splices shall be made with an 18 inch long, 1 - 9/16 inch diameter DOM tube with a minimum wall thickness of 3/16 inch, fastened on both sides of the splice with four 3/8 inch bolts.

D. Grid hangers are attached to the existing building ceiling. Provide supplementary support structure as required for hanger attachment.

E. Pipe grids shall be designed to support the dead load of the grid plus a minimum live load of 30 pounds per linear foot.

F. Pipe weight and hanger spacing shall be confirmed by the Rigging Contractor’s engineer.

2.3 SIGNAGE

A. Provide a “Rigging Information” sign. Wall mount the sign where directed by the Commissioner.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 COORDINATION

A. The Contractor is responsible for reviewing all drawings, specifications, and field conditions which affect the work in this Section. Notify the Commissioner whenever field measurements, analysis of the drawings and specifications, or progress of other trades indicates that the work in this Section cannot be completed as specified or as scheduled.

3.3 JOB CONDITIONS

A. The Contractor shall visit the site and verify all dimensions and existing conditions. The Contractor shall also be familiar with the work of adjoining trades and coordinate with their work.

3.4 PROTECTION OF EQUIPMENT

A. Protect the equipment in this Section from damage and deterioration during all phases of the work, from the time of manufacture to installation.

3.5 CLEANING AND REPAIR

A. When construction is complete, restore all system components to their delivered condition. This includes dusting, cleaning, and removal of construction materials.

B. Repair any work or finishes that are damaged during installation by the Contractor for the work in this Section. This includes the work in this Section and the work of other trades.

3.6 INSTRUCTION

A. Assist the facility’s maintenance staff in becoming familiar with the completed installation and personally instruct the facility’s maintenance staff in the proper use and maintenance of all equipment provided.

END OF SECTION 11 61 33

SECTION 12 22 00 - CURTAINS AND DRAPES

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. Drapes.

2. Drapery tracks.

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: For the following:

1. Drapery Tracks: Include maximum weights of drapes that can be supported.

2. Fabrics.

3. Textile treatments.

C. Shop Drawings:

1. Drapery Tracks: Show installation and anchorage details and locations of controls.

2. Drapes: Show sizes, locations, and details of installation.

D. Samples: As follows:

1. Drapery Tracks: 18 inches long, with carriers, controls, and accessories.

2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.

3. Textile Trims: For each color and pattern indicated, 18 inches long.

4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.

E. Samples for Initial Selection: For each type of product indicated.

F. Samples for Verification: As follows:

1. Drapery Tracks: 18 inches long, with carriers, controls, and accessories.

2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.

3. Textile Trims: For each color and pattern indicated, 18 inches long.

4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.

G. Product Schedule: For drapes and drapery tracks. Use same designations indicated on Drawings.

H. Coordination Drawings: For drapery track installation; reflected ceiling plans drawn to scale and coordinating track installation with openings and ceiling-mounted items, on which the following items are shown:

1. Suspended ceiling components.

I. Product Certificates: For each drapery fabric treated with flame retardant, signed by fabric supplier and indicating treatment durability and cleaning procedures required to maintain treatment effectiveness.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Provide 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.

PART 2 - PRODUCTS

2.1 DRAPERY TRACKS

A. Manually Operated Track: Basis of Design Curtain track: Rose Brand Trak-Eze 220 series rack system, soffit-mounted or approved equal by one of the following:

1. I. Weiss

2. Recmar

3. Or approved equal.

B. Construction: Extruded aluminum, slotted for mounting at interval of not more than 24 inches o.c. and bendable to radii indicated.

1. Lengths and Configurations: As indicated on Drawings.

2. Support Capability: Weight of drapery indicated mounted on track length indicated.

3. Finish: As selected by the Commissioner.

C. Mounting Brackets: Aluminum, of type suitable for fastening track to surface indicated and designed to support weight of track assembly and drapery plus force applied to operate track.

1. Mounting Surface: As indicated on Drawings.

2. Size: As indicated on Drawings.

D. Installation Fasteners: Sized to support track assembly and drapery, and fabricated from metal compatible with track, brackets, and supporting construction. Provide two fasteners to fasten each bracket to supporting construction.

E. Operation: Baton

F. Carriers: Rollers with hooks

G. End Stops: Manufacturer's standard with track end cap.

2.2 DRAPES

A. Curtain fabric: As a Basis of Design, Rose Brand 20 oz. Crescent velour, medium weight, matte, 99% opaque approved equal by one of the following:

1. Drapery Industries

2. Kirsch

3. Or approved equal.

B. Source Limitations: Obtain each color and pattern of drapery fabric and trim from one dye lot.

C. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a qualified testing and inspecting agency.

D. Orientation: Run right.

E. Width: 54”.

F. Textile Treatments: Stain repellent

G. Lining Fabric:

1. Lining Type: Water resistant.

2. Product: Selected by fabricator for use with drapery fabric indicated.

3. Color: to match drape.

H. Hem Weights: 1-inch square lead weights.

2.3 DRAPE FABRICATION

A. Fabricate drapes in heading styles and fullnesses indicated. Fabricate headings to stand erect. If less than a full width of fabric is required to produce panel of specified fullness, use equal widths of not less than one-half width of fabric located at ends of panel.

1. One-Way-Stacking Drapes: Add 5 inches to overall width for returns.

2. Center-Opening Drapes: Add 10 inches to overall width for overlap.

B. Seams: Sew vertical seams with twin-needle sewing machine with selvage trimmed and overlocked. Join widths so that patterns match and vertical seams lay flat and straight without puckering. Horizontal seams are unacceptable.

C. Side Hems: Double-turned, 1-1/2-inch wide hems consisting of three layers of fabric, and blindstitched so that stitches are invisible on face of drape.

D. Bottom Hems: Double-turned, 4-inch wide hems consisting of three layers of fabric, and weighted and blindstitched so that weights and stitches are invisible on face of drape.

1. Sew in square lead weights at each seam and at panel corners.

E. Interlinings: Extend from top of drape to within 1/2 inch of lining's bottom hem and to leading edge of side hems to produce full-shadowed appearance.

F. Linings: Equal to widths of drapery fabric and joined to drapery fabric at top by inside invisible seam, and hand stitched at side hems and shadowed with 1-1/2-inch return of face fabric.

1. Bottom Hem: Blind stitch to drapery fabric.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 DRAPERY TRACK INSTALLATION

A. Install track systems according to manufacturer's written instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.

B. Isolate metal parts of tracks and brackets from concrete, masonry, and mortar to prevent galvanic action. Use tape or another method recommended in writing by track manufacturer.

3.3 DRAPE INSTALLATION

A. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 1/4 inch.

B. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 1 inch and not less than 1/2 inch.

C. Where drapes extend to windowsill, install so that bottom hems hang above sill line and clear sill line by not more than 1/2 inch.

3.4 ADJUSTING

A. After hanging drapes, test and adjust each drapery track to produce unencumbered, smooth operation.

B. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.

C. Remove and replace drapes that are stained or soiled.

END OF SECTION 12 22 00

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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. Electrically operated window shades (Solar and Black-out).

3. Field measurements of as-built conditions.

4. 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.

1. Motorized Shade Operators: Include operating instructions.

2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

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: Install each type of shade assembly on one complete column bay.

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, motors, motor control system 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 comparable product by SWF Contract, Hunter Douglas, Lutron or approved equal conforming to standards specified herein.

B. Provide shade system of 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 components include the following:

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 must 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 allows for operation of multiple shade bands (multi-banded shades) by a single chain operator. Offset connectors 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 similar product by a manufacturer listed in 2.1A or approved equal.
    b. Drive Chain: #10 qualified stainless steel chain rated to 90 lb.
    c. Minimum Breaking Strength: Nickel plate chain will not be accepted.

C. 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. Provide hem weights of appropriate size and weight for shade band. Provide hem weight that is continuous inside a sealed hem pocket. Provide same hem pocket construction and same hem weights 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 must be removable/ replaceable with a snap-on/snap-off spline mounting, without having to remove shade roller from shade brackets.
c. Provide mounting spline that does not require use of adhesives, adhesive tapes, staples and/or rivets.

2.2 ELECTRICALLY OPERATED SHADES

A. Provide electrically operated shade system equal to "Electro-Shade" made by the Mecho-Shade Corp. or comparable product by SWF Contract, Hunter Douglas, Lutron or approved equal conforming to standards specified herein.

B. Access and Material Requirements:

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.

C. Motorized Shade Hardware and Shade Brackets:

1. Provide shade hardware constructed of minimum 1/8’ thick plated steel, or heavier, thicker, as required to support 150% of the full weight of each shade. Plastic components without use of steel angle construction do not meet the intent of this specification and will not be accepted.

2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).

3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor.

a. Provide one shade band per window unit up to six shade band units per motor.
b. Align all shade bands within a single motor group within 1/4".

D. Shade Motors:

1. Intelligent Encoded Motor and Control system: tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60 Hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.

2. Conceal motors inside shade roller tube.

3. Maximum current draw for each shade motor of 2.3 amps.

4. Use motors rated at the same nominal speed for all shades in the same room

5. Wall Switches:

a. Where noted shades must be operated by a 4 and 8 button low voltage programmable intelligent switches (IS). Provide standard switch wired to a bus interface and bus interface programmed to transmit an address for the local switch.
b. Intelligent switches may be installed anywhere on the bus line. Each IS must be capable of storing one control level address to be broadcast along the bus line.
c. An address that is transmitted by either a switch or central controller must be responded to by those motors with the same address in their control table.
d. IS must provide for interface with other low voltage input devices via a set of dry contact terminals located on the switch.
e. Standard switch or IS may control an individual, sub-group or group of motors in accordance with the address in each motor.

2.3 SHADE CLOTH

A. Solar Shade Cloth: "Eco-Veil" group, 1350 Series of weave, color and optical properties as selected by the Commissioner made by MechoShade, or comparable product by SWF Contract, Hunter Douglas, Lutron or approved equal.

B. Black-Out Shades: "Equinox 0100 Series" opaque acrylic black-out shade cloth made by MechoShade, or comparable product by SWF Contract, Hunter Douglas, Lutron or approved equal; color selected by the Commissioner.

2.4 ACCESSORIES

A. Wall mounted bracket for solar shades.

B. Provide recessed pocket with blackout channels where indicated.

1. Blackout Channels: Extruded aluminum, with black anodized finish.

C. Hem Pockets and Hem Weights: Fabric hem pocket with RF welded seams (including welded ends) and concealed hem weights. Provide hem weights of appropriate size and weight for shade band. Provide hem weight that is continuous inside a sealed hem pocket.

2.5 FABRICATION

A. The shade and the fabric must hang flat without buckling or distortion. The edge, when trimmed, must hang straight without curling or raveling. An unguided roller shade cloth must roll true and straight, without shifting sideways more than +/- 1/8" in either direction due to warp distortion or weave design. Shades must 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 requirements governing execution.

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.

3.4 INSTALLATION OF MOTOR OPERATED 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. To control the responsibility for performance of motorized roller shade systems, assign the engineering and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer. Provide power wiring (line voltage) in accordance with the requirements provided by the manufacturer. Coordinate the following:

1. Provide power panels and circuits of sufficient size to accommodate roller shade manufacturer’s requirements, as indicated on the mechanical and electrical drawings.

2. Coordinate with requirements of roller shade installer/dealer before inaccessible areas are constructed.

3. Run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.

4. Provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/control locations designated by the Commissioner. All above ceiling and concealed wiring must be plenum rated, or installed in conduit, as required by the New York City Building Code.

5. Provide conduit with pull wire in all areas, which might not be accessible to roller shade installer due to building design, equipment location or schedule.

C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

END OF SECTION 12 24 13

SECTION 13 48 00 - SOUND, VIBRATION, AND SEISMIC CONTROL

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. Roll out isolation mat.

B. Related sections

1. Section 06 10 00 "Rough Carpentry"

2. Section 09 64 53 " Resilient Wood Flooring Assemblies"

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Assurance".

B. Manufacturer: Floating floor systems and materials shall be designed and fabricated at the facilities of a nationally recognized manufacturer having a minimum of three (3) years experience in furnishing similar systems.

C. Installer: Company specializing in applying the work of this Section with minimum three (3) years' documented experience, and approved by manufacturer.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

B. Product Data: Submit product data including manufacturer’s detailed technical product data and installation instructions for each type of acoustical pad and accessories, wood flooring and finishes. Include instructions for handling, storage, installation, perimeter expansion provisions, dimensions for individual components, profiles, edge detail, finishing, protection, and maintenance.

C. Shop Drawings: Submit drawings showing the construction of the various parts of the work, including connections of the system components to adjacent parts of the building structure. Drawings shall include complete installation instructions showing layout of acoustical items and types of wood flooring, including plans, elevations, sections, details of anchorage and attachments to other units of Work, and conditions requiring reducer strips, nosings, or other accessories.

D. Test Reports: The Contractor shall submit copies in triplicate of certified test reports, from independent laboratories, which are specified as verification of performance for the specified sound isolation system if an alternative system to that specified is being submitted.

1. Certification of the elastomeric compound to the listed AASHO specification.

2. Dynamic frequency test data verifying 10 Hz maximum frequency.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect wood materials from exposure to moisture in shipment, storage, and handling. Deliver in unopened cartons or bundles and store in a dry place with adequate air circulation. Do not deliver material to building until concrete, plaster, masonry, ceramic tile, and other wet work is complete and cured to a condition of equilibrium and temperature and humidity are maintained at or near occupancy levels.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install wood materials until wet construction work is completed and ambient air at installation space has moisture content stabilized.

1. Provide permanent heat, light, and ventilation prior to installation.

B. Moisture Content: At time of delivery, average moisture content of wood materials to be 6 to 9 percent, with a maximum of 12 percent for any one piece and not more than 5 percent outside of given average range.

C. Conditioning: Do not install wood materials until spaces are enclosed and at approximate humidity condition planned for occupancy. Condition wood for 5 days before start of installation by placing in spaces to receive flooring and maintaining ambient temperature between 65 deg. F and 75 deg. F before, during, and after installation. Open sealed packages of wood flooring to permit natural adjustment of moisture content and allow flooring to acclimate to the room conditions.

1.7 WARRANTY

A. Warranty: Submit a written warranty executed by Manufacturer agreeing to repair or replace wood flooring that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to:

1. Buckling, warping, squeaking, and loosening.

2. Warranty Period: 1 year from date of Substantial Completion.

PART 2 PRODUCTS

2.1 FLOATING FLOOR

A. The floating floor system includes isolation pads bonded to low density sound absorption acoustical material in roll form and perimeter isolation, constructed as detailed in the contract drawings.

1. Provide high density molded fiberglass pads individually coated with a flexible elastomeric membrane

a. Isolation Pads:
1). 2” thick
2). Spaced as recommended by the manufacturer but not greater than 16” centerline spacing.

3). Manufactured from annealed glass fibers stabilized by precompression during manufacture.

4). Designed to safely withstand a minimum imposed load of 75 PSF in all open areas and with a minimum overload capacity of 100% in all high load areas.

b. Pads must have satisfactorily passed WMATA Section 3.49 dynamic test for isolator permanence.

2. Provide 1-1/2” thick low-density fiberglass absorption material bonded to the isolation pads and covering a minimum of 95% of the area between the isolation pads.

3. Perimeter Isolation: 3/8” thick strip of perimeter isolation board; resilient material as recommended by the manufacturer.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Kinetics Noise Control, Inc.; Model RIM or comparable product by one of the following:

1. Soundisoco

2. Shaw Wood Flooring

3. Or approved equal.

C. Wood Flooring Materials: See Section 09 64 53, Resilient Wood Flooring Assemblies.

2.2 PERFORMANCE TESTING

A. The isolation system shall have been tested for acoustical performance by an independent testing laboratory and the rating shall meet or exceed STC 66 and IIC 63 as tested over a 6” thick concrete structural slab.

B. Submit copies of certified acoustical test reports verifying performance criteria specified for the floating wood floor isolation system.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for requirements governing execution.

3.2 INSTALLATION, GENERAL

A. Install all sound isolation materials specified herein, including those installed under other sections of the specifications, in accordance with procedures submitted by the isolation material manufacturer, and approved by the Commissioner.

B. All sound isolation materials and building components supported by isolation materials must be free from rigid contact with any part of the building structure.

3.3 SITE REVIEW

A. Notify the Commissioner and the field representative of the isolation material manufacturer to review installation on site at the following stages:

1. Upon completion of all areas prior to the placement of isolation materials, all surfaces shall receive their approval before installation of isolation materials.

2. Upon completion of placement of isolation materials and prior to placement of wood flooring materials, the manufacturer's representative must be on hand to ensure that proper procedures and techniques are strictly followed.

3. Make final inspection of sound isolation upon completion of finished floor surface installation and installation of sealants. Evaluate any evidence of faulty performance and correct such imperfections. Cut out any area subject to short circuiting and properly install to ensure a satisfactory sound isolation performance. Correct any evidence of faulty performance due to isolation materials used by replacement or alteration of the isolation material.

END OF SECTION 13 48 00

SECTION 14 21 00
ELECTRIC TRACTION ELEVATORS

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.

1.2 SUMMARY:

A. These specifications are intended to cover the complete installation of one (1) machine-room-less (MRL), gearless traction elevator designated "PE-1".

B. The finished product shall be in full compliance with all applicable codes.

C. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections include, but is not limited to the following:

1. Section 06 10 00, ROUGH CARPENTRY.
2. Section 09 21 16, GYPSUM BOARD ASSEMBLIES
3. Division 21 – FIRE SUPPRESSION.
4. Division 23 – HVAC.
5. Division 26 – ELECTRICAL.

1.3 RELATED WORK:

A. A mainline fused disconnect switch or circuit breaker shall be provided for the elevator in the control room.

B. The mainline disconnect switch shall be located approximately 18 inches from the strike side of the control room door and 52 inches above the floor.

C. A car light disconnecting means shall be provided for the elevator in the control room adjacent to the main line disconnect switch. Three (3) 20 AMP circuits for the elevator are required.

D. Control room lighting with the light switch located directly adjacent to the strike jamb and two (2) 20 AMP G.F.I. outlets in the control room.

E. A phone line circuit in the control room for emergency communications (24 hour emergency communications to an accessible location must be provided.). Phone line to be run in E.M.T. and terminated in a junction box adjacent to the elevator controller. Provide one (1) phone line for the elevator.

F. Adequate ventilation of the control room to maintain temperature between 55°F. and 90°F., not to exceed 85% relative humidity.

G. A weather resistant type lighting fixture and G.F.I. outlet in the elevator pit and overhead. (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 and as shown on the layout drawings for the overhead location. Final locations of light, outlet and switch to be field coordinated in accordance with the elevator layout drawings.

H. Smoke detectors in the control room and hoistway (in accordance with building code requirements) including wiring and activation signals brought to the elevator control room terminating in a junction box located adjacent to the elevator controller. Confirmation of fire return floor.

I. Hoistway smoke exhaust provisions in accordance with the Building Code of the City of New York. Smoke "vent" shall be located directly under the hoistway roof and shall be open directly to the outside air or through non-combustible ducts to the outside. Provide a minimum of three (3) square foot open area ventilation (a minimum of one-third of which shall be permanently open.)

J. Enclosed and protected control room. Minimum control room height shall be 8' - 0".

K. Access to control room and pit to be a minimum of 3' – 0" wide by 6' – 8" high and should be self-closing and locking. The lock should be non-canceling and operate from within the room without the use of a key.

L. Clear hoistway plumb from top to bottom with variations not to exceed one (1) inch at any point in the first 100 feet. Tolerance may increase at 1/32 inch for each additional ten (10) feet up to a maximum displacement of two (2) inches.

M. Beveled guards are required for projections, recesses and setbacks in the hoistway that project more than two (2) inches inside the general line of the hoistway on sides not used for loading or unloading.

N. Hoistway protection in case of fire. (Two (2) hour rated enclosure or as required by the Building Code of the City of New York.

O. Supports for guide rail fastenings at each floor and/or intermediate supports. Supports shall be placed at intervals not exceeding 14' – 0" throughout full height of the shaft.

P. Supports for machinery, sheave beams and d-e-h beams.

Q. Recesses, fireproofing and patching, as required, to accommodate hall button boxes, signal fixtures, hoistway entrance frames, etc.

R. Vertical, noncombustible governor access ladder and platform.

S. Pit shall include sump pit, grating and pump or drains. Drains connected directly to sewers shall not be installed. Provide covers over sump pit or drains.

T. Pit reinforced to sustain vertical forces from guide rails and buffers.

U. Furnishing, installing and maintaining the required fire rating of elevator hoistway walls, including the penetration of fire wall by elevator fixture boxes.

V. The interface of the elevator wall with the hoistway entrance assembly shall be in strict compliance with the elevator supplier's/contractors supplier's requirements.

W. Refer to the drawings for other work associated with and/or related to the elevator installation.

X. Provide contacts from the emergency power (2 required). The first shall indicate that emergency power is provided. The second shall be a pre-transfer contact to identify the switch back to normal power. The elevator shall be provided with emergency power.

Y. Provide overhead grating, ladder and access panel.

1.4 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Company shall have at least three (3) years' experience of elevator installations of the type and manufacturer specified.

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. ASMA A17.1 Safety Code for Elevators and Escalators, applicable edition.
2. Title III of the Americans with Disabilities Act (ADAAG).
3. 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 Contractor shall survey the shafts and obtain all measurements and conditions which are related to Contractor's work. The Contract Documents are for reference only and shall not be considered sufficiently accurate for the proper engineering of the system.

C. 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.

D. 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 concrete structure and divider 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, sheave beam supports, etc.
3. Provide control 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 for car stations. Provide faceplate fastener and hinging method and type.
7. Provide cut section through emergency light, position indicator, telephone, buttons, Braille plates and service cabinet, if request.
8. Car frame and car platform construction details and layout complete. (If requested)
9. Provide any and all sketches, clarifications and drawing modifications requested by the Commissioner. All ancillary sketches requested shall be scaled and adequately detailed for review.

E. Sample submissions (as requested by the Commissioner) may include:

1. Cab or fixture material and finishes.
2. Braille plates and jamb designation.
3. Push-buttons, position indicators, emergency lighting fixture.

F. Finished cab shall be fully assembled in the shop for review by the Commissioner prior to shipment to the jobsite.

1.7 GUARANTEE SERVICE:

A. Furnish full protective guarantee service on the equipment described herein for a period of one (1) year from the date of substantial completion. The guarantee 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 guarantee service period and shall use only genuine standard parts produced by the manufacturer of the equipment installed.

B. All work under the guarantee 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 section. Response to a shutdown shall be within one (1) hour. A service technician shall be dispatched immediately and shall be on-site within one (1) hour of the shutdown call.

C. Provide full protection interim guarantee service on the elevator from the notice to proceed for the duration of the overall project. Upon substantial completion, the included one (1) year full protection shall commence.

D. Full protective 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. Machine, drive and deflector sheave, sheave shaft bearings, brake pulley, brake coil, brake contact, shoes and linings, and component parts.
3. Motor, motor drives, motor windings, rotating element, commutator, field coil, brushes, brush holders and bearings, rotors, stators, slip rings.
4. Governor, governors sheave and shaft assembly, bearings, contacts and governor jaws.
5. Deflector or secondary sheave, bearings, car and counterweight buffers, car and counterweight guide rails, top and bottom limit switches, governor tension sheave assembly, compensating assembly, counterweight and counterweight guide shoes, including rollers or gibs.
6. 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.
7. 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.
8. Hoistway limit switches, slowdown switches, leveling switches and associated cams, vanes, and electronic components.
9. Guide shoes including rollers or replaceable gibs.
10. 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.
11. Traveling cables.
12. Elevator control wiring in hoistway and control room.
13. Car safety mechanism and load weighing equipment.
14. Buffers.
15. All car and hoistway operating fixtures including hall lanterns, main Lobby fixtures, car operating panels, car position indicator, car fans, electric door operators, proximity devices, safety edge, photo eyes, door reflectors and starters' panels.
16. 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.
17. Furnish lubricants compounded specifically for elevator usage.

18. After substantial completion, the Contractor shall not be responsible for the following items of elevator equipment: cab interior (including removable panels, door panels, car gates, plenum chambers, hung ceilings, light diffusers, light tubes and bulbs, handrails, mirrors and carpets): hoistway enclosure, hoistway door, frames and sills. Negligence, misuse and vandalism shall not be excluded from the Contractor's guarantee service responsibilities prior to substantial completion. Misuse by any of the subcontractors during construction shall be the Contractor's responsibility.
19. Contractor shall perform the required mandated inspections and tests during the term of the included one (1) year guarantee service.

E. 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.

F. 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 shall be notified of these deficiencies in writing, and it shall be the Contractor's responsibility to make the necessary corrections within 30 days after receipt of such notice.

G. Approximately six months prior to the end of the guarantee service, the Commissioner may make a thorough guarantee service inspection of the elevator covered under this section. At the conclusion of this inspection, the Commissioner 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.

H. Working Hours

1. The Contractor shall provide emergency call back service for the elevator under which the Contractor agrees to have a workman report to the site of the emergency within one hour after receipt of a request for such service by telephone. This emergency call back service shall be limited to minor adjustments or restorations to provide uninterrupted elevator service. Emergency call back service shall be performed as part of this section without additional charges. Minor adjustment or restorations shall include those which can be remedied utilizing spare parts listed below.

I. Safety Inspection and Tests

1. All service and restoration work shall be performed in compliance with the American National Standard Safety Code for Elevators, Escalators and Moving Walks, and shall be subject to safety inspection by the Commissioner. Periodic inspection of the elevator as required by the ASME A17.1 Code shall be performed by the Contractor. Provide personnel who are familiar with the equipment to perform tests. Periodically examine and test all safety devices. Make formal safety tests and inspections as required and outlined in the ASME A17.1 Code. The tests shall be conducted in the presence of the elevator inspector designated by the NYC Department of Buildings Elevator Division. It will be the responsibility of the Contractor to determine when these tests are due.

1.8 GUARANTEE:

A. Guarantee in writing that any defects not due to ordinary wear and tear or improper use which may develop within one (1) year from the date of substantial completion of the elevator installation will be made good.

B. During the guarantee period, replace or restore any piece of equipment that is found to be defective. The replacement or restoration shall be done as soon as notified. Restore all damage to surrounding work caused by defective equipment. At a minimum, defects shall include abrasions, rattling, noisy ventilation and deterioration of finishes, including but not limited to discoloration, pealing, twisting, warping, oil canning, delaminating, etc.

1.9 CONDITIONS:

A. The Contractor shall examine all drawings relating to this work, and become fully informed as to the extent and character of the work required. All measurements, layouts and the exact conditions of the work shall be verified by the Contractor. If any of the conditions conflict with or affect the proposed work, the Contractor shall notify the Commissioner in writing.

B. All equipment and shop work area shall be provided by the Contractor and shall be in an area approved by the Commissioner.

C. Any work that is disturbed by this work, shall be restored to a "like New" condition by the Contractor.

D. The Contractor shall take measurements at the project site so that all of Contractor's work will properly fit together and conform to and join the work installed under other sections of this Contract. The Contractor, before commencing work, shall make certain that all adjoining work on which this work is in any way dependent for perfect workmanship, shall be properly in place and in proper order to receive all elevator work.

1.10 MANUFACTURER'S WARRANTY

A. Warranty the Elevator against defects in materials and workmanship for a period of one year from Substantial Completion.

PART II – PRODUCTS

2.1 DESCRIPTION OF ELEVATOR:

A. Machine-Room-Less (MRL) Gearless Traction Elevator (PE-1):

1.	Quantity:	One (1) Passenger Elevator
2.	Type:	Gearless Traction Type (MRL)
3.	Capacity:	4,000 Pounds
4.	Speed:	200 F.P.M.
5.	Travel:	52' - 6" (approximate)
6.	Number of Landings:	6 @ C, 1, 1M, 2, 3, 4

(Rear Opening @ C Level Only)

7.	Number of Openings:	Same as Landings
8.	Operation:	Simplex Selective Collective
9.	Control:	Microprocessor with VVVF-AC Drive
10.	Number of Push Button Risers:	One (1)
11.	Clear Cab Inside:	5’ – 6” Wide x 7’ – 5” Deep (Nominal)
12.	Guide Rails:	Minimum 15 Pound for Car and 8 Pound for Counterweight
13.	Buffers:	Spring
14.	Cab:	As Further Specified
15.	Hoistway Door Size:	4’ – 0” Wide x 7’ – 0” High
16.	Door Operation:	Two-Speed Side Opening
17.	Fixture and Signals:	As Further Specified
18.	Machine Type:	(MRL) Gearless
19.	Control Room:	Over Hoistway
20.	Power:	3 Phase Building Voltage
21.	Fixtures:	Metal Buttons
22.	Ropes:	Traction Steel or Belts
23.	Car Frame Construction:	Steel
24.	Platform Construction:	Steel with 1 Layer ¾” Exterior Grade Plywood
25.	Entrances:	Stainless Steel
26.	Special Operations:	Fire Emergency Service Independent Operation Security Operation Emergency Power Provisions Voice Annunciation in Accordance with ADA Battery Back-Up Overload Controls and Indicators

2.2 CONTROL ROOM EQUIPMENT:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hollister Whitney
2. Kone Elevator Company
3. Otis Elevator Company
4. Thyssen Krupp Elevator Company
5. Approved Equals

B. Hoist Machine:

1. Gearless traction designed for machine-room-less (MRL) application.
2. Provide all beams, DEH plates and ancillary steel for equipment support. Include provisions and coordination for grating design and support.

C. Gearless Elevator Hoisting Machine Motor AC:

1. Designed for machine-room-less application.

D. Ascending Car Overspeed Protection Device:

1. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.

E. Unintended Car Movement Protection Device:

1. Provide a device to prevent unintended car movement away from the landing when the hoistway doors are not in the closed and locked position and the car doors are not in the closed position.

F. Solid State Controller:

1. Provide the elevator installation with controllers to fit within the space conditions.
2. The Controller shall be non-proprietary and equipped with solid state components and printed circuit boards to control the hoisting machine and signal functions in accordance with this specification.
   a. Manufacturers: Subject to compliance with the requirements of this Section, provide controller equipment of one of the following:
      1) Kone
      2) Otis
      3) Thyssen
      4) Approved Equal
   b. The controller shall include, but not be limited to the following features:
      1) Password accessible.
      2) Inspection control.
      3) Fireman's service.
      4) Independent service.
      5) Diagnostics.
      6) Remote monitoring.
3. The controller assembly shall provide efficient, smooth, step-less acceleration and deceleration of the elevator hoisting machine, automatically and irrespective of the load in the car. All control equipment shall be enclosed in a metal cabinet with lockable, hinged door(s), and shall be provided with a means of forced ventilation. All non-conducting metal parts in the control room shall be grounded in accordance with controller manufacturers' specifications and the latest International Electrical Code. Cabinet shall be securely attached to the building structure.
   a. All Controllers shall be identified with 4 inch letters.

4. Modules or Solid State boards for the control of the elevator system, including dispatching, signals, door operation, etc. shall be installed in a NEMA Type I, General Purpose Enclosure. All similar modules or solid state boards shall be interchangeable between controllers of a particular development and interchangeable with other controllers built to the same specifications.

5. Modules or solid state boards shall be fuse protected. Each module or solid state board and fuse (with ampere rating) shall be identified by name, letter or standard symbol in an approved, indelible and legible manner on the device or panel. Coordinate identification markings with identical markings on wiring diagrams.
6. The electrical connections between the printed circuit boards (modules) and the circuit connectors incorporated in the mounting racks shall be made through individual tabs which shall be an integral part of each module. The tabs shall be nickel-gold plated (or of other approved metal of equal electrical characteristics). Modules shall be keyed or notched so as to prevent insertion of the modules in the inverted position.
7. Light emitting diodes (LEDS) shall be used for visual monitoring of individual modules and marked with familiar terminology.
8. Components shall have interlocking circuits to assure fail-safe operation, and to prevent unwarranted elevator movement, should any component fail to function properly.
9. Wiring shall be arranged so that similar voltages are grouped together.
10. If modules are used, they shall be of the type that plug into pre-wired mounting racks. Field wiring or alteration shall not be necessary in order to replace defective modules.
11. Field wiring changes shall be made only to the mounting rack connection points and not to the individual module circuitry or components. Individual modules, requiring design changes shall be returned to the factory where changes shall be made and module design records updated so that correct replacement units shall be available.
    a. All shaft and traveling cable wires shall be able to withstand accidental connection to any other shaft or traveling cable connection without causing permanent damage to the equipment. Replacement of fuses or other protection devices is acceptable. All outputs shall withstand the application of a short circuit across the output terminals without causing permanent damage to the equipment.
12. Module boards shall be moisture resistant, fabricated from non-conductive, non-corrosive material, and shall be of sufficient strength so as to support all components mounted thereon without warping. Mounting racks shall be spaced sufficiently apart to prevent accidental contact between individual modules.
13. All logic symbols and circuitry designations shall be in accordance with ASME Standards.
14. Solid state components shall be designed to operate normally within a temperature range of 20° F, and 120° F.
15. Wiring connections for operating circuits and for external control circuits shall be brought to terminal blocks mounted in an accessible location within the controller cabinet. Terminal blocks using pierce-through serrated washers are not permitted. Clearly mark and color code the voltages on the terminal strips.
16. A diagnostic testing device shall be permanently installed on each controller, for all trouble-shooting procedures related to the specific type controls installed for this Section.
    a. Diagnostics shall include but not be limited to the following control circuits:
        1) Interlocks.
        2) Car door gate switch.
        3) Up and down slowdown limits.
        4) Up and down normal limits.
        5) Up and down final limits.

6) Emergency stop switch in car.
7) Emergency stop switch on top of car.
8) Safety plank switch.
9) Governor overspeed switch(es).
10) Top and or side emergency exit switch.
11) Comp sheave switch.
12) Hoist motor overloads.
13) Pit stop switch.
14) Tape switch.
15) Oil Buffer switch.
16) Door Operator overload switch.
17) Generator overload switch.

b. The Fault Monitoring System shall record and report faults in a sequential fashion. When more than one (1) contact is open, the contact with the highest priority will be displayed first. After this one is satisfied any additional open contacts will be displayed in the same sequential fashion.
c. Error messages are to be stored in a non-volatile memory for future recall.
d. If restoration or replacement of the testing device's become necessary prior to the end of the one (1) year Guarantee period, the restoration or replacement shall be provided to the City of New York.

17. Controller shall be provided with the capability of having qualified elevator personnel move the elevator at inspection speed with safety circuit open. This operation is to be available by operating selective relays on the controller.
18. The use of standard issue communication devices, such as walkie-talkies, from in front of the controllers, with the doors open, should not cause intermittent or permanent problems with the proper operation of the controller equipment.
19. The Contractor shall provide electrical (over-current) protection for the elevator hoist motor. When activated, it shall disconnect power from the elevator hoist motor and hoist machine brake. Activation of the motor protection device shall require a "Manual Reset". The motor protection device shall be clearly labeled and identified at the terminals and a cover plate shall be provided with a light illumination indicating that this device has been tripped with a reset button provided to restore normal operation. The motor protection equipment and its method of connection to the elevator system must be shown on the wiring diagram.
20. In the event of a power outage, the equipment shall be arranged, so that once the normal power supply has been re-established, the elevator will automatically return to service.
21. The Safety circuits shall be designed to individually fuse the following:
    a. Gate switch & secondary gate switch.
    b. Interlocks.
    c. Normal limits (up & down).
    d. Final limits (up & down).
    e. Slowdown limits (up & down).
    f. Pit switch, governor switch, buffer switch, comp switch & pit door switch.
    g. Top emergency exit switch, Car safety switch, top of car inspection stop switch, side exit switch, stop switch in car, safety edge & electric eyes.
22. The control system for the elevator shall be arranged to maintain consistent acceleration and deceleration rate changes and floor leveling accuracy regardless of load.

23. Controller shall incorporate direction switches, reverse phase protection, over current protection, single-phase protection in each phase, and switching to provide smooth acceleration and deceleration.
24. Provide rubber mats in front of all controllers and group supervisory panels.

G. Variable Voltage Variable Frequency - AC Control System:

1. The elevator hoist machine shall be geared traction having an AC motor. The control of the hoisting motor shall be by means of a solid state drive system. The speed, acceleration and deceleration shall be automatically and continuously controlled by varying the frequency and voltage of the motor. A closed loop system shall be provided.
2. The drive shall utilize a 3 phase, full wave rectifier and capacitor bank to provide direct current for the solid state inverter. The control principle shall be based on constant flux control utilizing pulse width modulation. The drive shall be capable of providing not less than 200% of the motor name plate rated current for not less than 60 seconds.
3. A means shall be provided for removing regenerated power from the drive DC power supply. This power shall be dissipated in resistors or returned to the 3 phase AC power line. Failure of the system to remove the regenerated power shall cause the drive output to be removed from the hoist motor.
4. The final stopping shall be performed independent of the machine brake which shall be applied to hold the car at a floor only after the car has stopped.
5. The drive shall not create excessive audible noise in the elevator motor and control system.
6. The drive system shall include but not necessarily be limited to the following features:
    a. Maintain a car speed within +/- 5% of the rated speed.
    b. Protection against excessive motor current in addition to normal overload relays.
    c. Maintain operation within 90 to 110% of nominal line voltage.
    d. Line fault protection to prevent operation under:
        1) Loss of phase.
        2) Low line voltage.
        3) High line voltage.
    e. The transistor protection shall ensure 100% protection of the transistors and prevent fuse blowout.
    f. Continuous supervision of the braking resistors shall be provided.
    g. Motor contacts shall disconnect the motor stator winding during each stop. In normal operation, the contactors shall operate only under zero current conditions, but must be capable of interrupting the line current should an emergency stop be required.
    h. The drive system shall continuously monitor the hoisting motor operation and motor torque in order to ensure 100% safe elevator operation at all times.

H. Selectors:

1. Provide a selector electronically or magnetically operated and located on Car Top or in Elevator Control room. The operation of the selector shall be to govern functions such as direction of travel, automatic stopping and leveling at landings. Selectors shall have a correction feature at least once in each direction of travel and at terminal landings. Cable and/or tape driven selectors shall not be permitted.

I. Speed Regulation:

1. Speed regulation shall be such that the maximum velocity attained with any load up to full load in the car on either "Up or "Down" motion shall not vary more than 5% plus or minus from normal operation velocity.
2. The acceleration and deceleration of the car under any condition of load shall be as nearly constant as is possible with the method of control specified and employed, and shall be independent of the operating devices in the car.
3. Entire elevator equipment including hoisting machines and controllers shall operate without noticeable irregularities and as quietly as can be obtained by use of high grade materials, first class workmanship, and adjustment.

J. Speed Governor and Tension Sheave:

1. Provide centrifugal type speed governor with an overspeed switch for each direction of travel. Safety rope grip shall lock in position when governor trips and shall be held in contact with the rope both by springs, and by sliding action and pull of the rope in the grip. The rope grip jaws shall be of the parallel jaw or equivalent type, of such shape and length that the pull-through action of the governor rope as required by the ASME Code will result in a minimum amount of abrasion. Governor jaws shall be machined and so arranged that if worn, they can be replaced. Speed governors shall be located in the overhead.
2. Provide a 24” x 24” stainless steel governor access door with hardware as required by Code.
3. Provide tension frame and sheave. Proper tension in governor rope shall be maintained by a weighted tension sheave located in the pit. This sheave shall be protected with a 16 USSG sheet metal guard to prevent foreign objects from being caught between the governor rope and sheave. Tension sheave shall be provided with a grease gun fitting to receive grease lubrication.

K. Device Numbers:

1. Provide the NYC designated elevator device numbers on each driving machine, controller, motor generator set or drive unit and the disconnect means. The device numbers must be on a metal tag "permanently attached", written in minimum of ¼ inch block letters.

2.3 OPERATIONS:

A. Independent Operation:

1. Independent service operation shall be provided in such a way that actuation of a keyswitch 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.

B. Simplex Selective Collective:

1. Simplex Selective Collective automatic operation shall be provided. 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.

C. Fireman Service Phase I and II:

1. Provide Fireman Service Phase I (Emergency Recall Operation) and Phase II (Emergency In-Car Operation) for the elevator as required by the latest adopted edition of the Building Code of the City of New York.

D. Emergency Power Operation Provisions:

1. Provisions shall be included in the new elevator control systems whereby immediately after transferring to the building emergency power system, the elevator automatically returns to the main fire recall landing. Car and corridor calls shall become inoperative and all previously registered calls shall be cancelled.
2. Upon completion of the recall process, the car shall remain available for continued operation.

E. Battery Lowering Device (Auxiliary Power Supply)

1. The auxiliary backup power supply for the VVVF controllers shall provide backup power when commercial power is lost, safely delivering the elevator car to a landing and maintaining door power so passengers can exit. During normal operation, the device shall build and maintain reserve energy while continuously monitoring commercial power. It will determine the optimum travel direction (next landing up or down) without requiring a load weighing system.

2.4 HOISTWAY EQUIPMENT:

A. Hoistway Entrance Frames:

1. Provide 14 gauge metal entrance frames and 16 gauge metal doors and extruded aluminum sills. The sills shall be no visible fasteners.
   a. Provide stainless steel No. 4 at all levels.
2. Entrance frames shall be fully welded and delivered to the jobsite fully assembled. The corners shall be welded with a flush surface, ground smooth and finished so there are no visible joint marks.
3. The Contractor shall provide all labor, material, equipment and service necessary to complete all metal work required by the drawings, and/or herein specified. Provide shop coat of metal protective paint on all steel components.

4. Hoistway Doors shall be U.L. rated, "B" labeled with a 1 ½ hour fire rating. Backside of door panels shall be painted.
5. Provide floor number designations, at least 4" high, on each hoistway entrance door (hoistway side). Provide floor designations for the disabled on both door jambs, sixty inches (60") above the floor. Floor number designations, shall be No. 19 gauge (0.042 inch) stainless steel plates with 2" high, characters raised 0.030 inches high, Sans Serif uppercase with a color-contrasting background. Place Braille characters immediately below the regular characters. Install the jamb mounted floor designation plates with the field or background flush with the jamb surface.
6. Hangers and Tracks: All doors shall be hung on heavy duty ball bearing, sheave type hangers, sheaves not less than 3-1/8" riding surface diameter with adjustable upthrust rollers of metal design, running on a polished steel track. Sheave rollers shall be of nylon or equal, with no flat spots. Hangers that are not mounted flush with the top of the door shall be provided with metal stiffeners and shall be installed to eliminate excessive movement. An upthrust safety retainer shall be installed on the door hanger to prevent the door from coming off the track due to vandalism.
7. Removable Guides: Each door panel shall be guided at the bottom by two (2) removable guides, of solid nylon or solid Teflon, mounted in galvanized steel brackets, and fastened with stainless steel machine screws, sliding in the hoistway slide door sill groove.
8. Rubber Bumpers: Provide rubber bumpers on the hoistway slide door hanger tracks, (both front and rear) instead of the hoistway door frame. After their final adjustment, permanently pin so that they cannot be removed.
9. Hoistway Slide Door Sill Mounted Spring Closers: Provide sill mounted hoistway side slide door spring closers for all hoistway entrances.
10. Hoistway Door Safety "Z" Bar Guide: Provide one (1) stainless steel safety "Z" bar guide on the underside of all doors and securely fasten to the underside of the door with stainless steel countersunk machine screws. Mount the safety "Z" guide adjacent to and in between the removable guides.
11. Fascias: Shall be #14 USSG galvanized steel reinforced to ensure a flat even surface. Securely fasten to the header and sill above. They shall extend 6 inches on each side of the jamb opening. Include fascia at all non-opening floors.
12. Toe Guards: Provide the lowest landing with a toe guard. The guard shall be No. 14 USSG galvanized sheet steel, secured to the lowest sill and gradually beveled to the wall. The guard shall be one foot wider than the door opening.
13. Fascias, cover plates, enclosures, dust covers and toe guards shall be galvanized steel.
14. Provide 16 gauge sight guards to match frame and door finish.
15. Provide 4" x 4" sill support angles or alternate sill support apparatus and grouted/dry-packed with mortar where applicable.

B. Hoistway Door Interlock:

1. Provide each hoistway entrance with electro-mechanical interlocks. Interlock shall prevent the operation of the elevator unless all doors are closed and positively locked. Interlock shall be of a type that shall satisfy the requirements of the ASME Code.
2. Provide all wiring from shaft riser to the new interlock. The wiring shall be type SF-2 Silicon insulated fixture wire with Silicon rubber insulation. Conductors shall have insulation with an operating temperature of 392ºF (200º centigrade). Flexible steel conduit running to shaft conduit boxes shall be properly supported with approved straps. All conduit and trough shall be painted black.

C. Terminal Stopping Devices:

1. Provide upper and lower normal terminal stopping devices arranged to automatically stop the car from any speed attained in normal operation within the top and bottom over-travel, independent of the operating devices, final terminal stopping device and buffer devices. All brackets shall be painted black.

D. Counterweight Guard:

1. Provide with a guard.

E. Load Weighing-Bypass Operation:

1. The load weighing bypass mode is initiated when the car is loaded to a pre-determined percentage of full capacity. Load weigh bypass mode gives the car the ability to answer car calls and lighten the load before answering any more hall calls. This mode performs the following operations:
   a. Hall initiated calls are ignored.
   b. All other elevator functions operate as if on full automatic service.

F. Buffers:

1. Provide oil buffers for the car and counterweight.
2. Provide channel support for mounting of the buffers.

G. Alarm Bells:

1. An electric signal bell shall be provided in or adjacent to the elevator hoistway and on the car top, as directed. This bell shall be connected to the alarm button in the car operating panel.

H. Pit Stop Switch:

1. Provide a watertight emergency stop switch for the elevator at the point of access to the pit. The switch shall have a metal guard to prevent accidental operation. Plastic or fiberglass material of box and faceplate shall not be permitted. When opened, the switch shall cause the electric power to be removed from the driving machine and brake. Final location shall be coordinated in the field.

I. Governor Wire Ropes:

1. During normal operation of the elevator, the governor rope shall run free and clear of the governor gripping jaws, rope guards and all other stationary parts.

J. Traveling Cables:

1. Traveling cables shall conform to the following:
2. All traveling cables shall be hung in self-locking loops (in an approved manner) on porcelain hanger and bracket or Kellems cable grips. The hanger and bracket shall be provided under the car platform and hoistway junction box, and shall be so located as to make traveling cables inaccessible from any door opening. The hanger and bracket shall be through-bolted to the cab floor.
3. Provide a junction box with terminal blocks at each end of the cable; properly terminate all conductor wires, including spare wires to provide complete circuit continuity. Provide all traveling cables to junction boxes with proper size connectors and properly secure to junction boxes.
4. Locate car junction box on the underside of each platform as close to the safety plank as possible. Locate hoistway junction boxes at mid-shaft in "High Rise" buildings and at top of shaft in buildings 8 stories or less. All terminal blocks shall have indelible identification numbers for each terminal connection and shall match the car junction box, hoistway junction box and controllers. Provide junction box covers with a watertight neoprene gasket. Cover plate screws shall be of the "captive type", stainless steel spanner head.
5. Separate alternating current and direct current conductors into individual travelers.
6. The cable shall be flexible, Type "ETT", with a steel hanger wire or type “ETP” flat elevator traveling cable. The minimum size of the D.C. copper conductors shall be No. 18 AWG. The minimum size of the AC copper conductors shall be No. 14 AWG. Each cable shall have 20 percent spare conductor wires (minimum of six (6) wires) and shall be UL listed. Provide metal eyelet’s, or other approved fasteners for each end of conductor wires.

K. Electric Wiring:

1. Wiring, conduit, fittings and installation shall be in accordance with Division 16, and comply with the requirements of the National Electric Code.
2. 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.
   a. Flexible metal conduit shall be permitted for short runs only (less than 36”).
3. 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:
   a. A minimum of 20% spare conductors (ends to be left accessible to facilitate connections at a later date).
   b. Wiring as required for the telephone and firemen’s communication (as required per the Building Code of the City of New York).
   c. Six (6) pairs of 18 gauge shielded cables, (terminating on terminal strips in the controller and in the car operating station).

L. Main Guide Rails:

1. Provide machine Standard “T” section guide rails, (minimum 15 lb./ft.) with tongue and grooved joints. 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 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").
2. The only structure which shall be provided for rail attachment shall be as shown in the Contract Documents. All additional bracing and brackets shall be the responsibility of the Contractor.

2.5 CAR EQUIPMENT:

A. Car Sling:

1. The car frame shall be constructed of steel members of adequate strength. The frame shall consist of two (2) stile members, two (2) cross head members and platform support frame. All members are to be securely fastened together and reinforced to form a unitized section.
2. Provide for a 7’ – 6” clear cab height (8’ – 0” overall cab)

B. Platform:

1. The platform shall be steel construction mounted on an auxiliary frame with vibration isolation pads. The floor is to be constructed of one (1) layer of 3/4" exterior 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.
2. Provide extruded aluminum sills without visible fasteners.

C. Car Safety:

1. Flexible guide clamp safety shall be mounted on bottom members of car frame and operated by a speed governor located over the hoistway. The safety shall be arranged to stop the car whenever excessive descending speed is attained, and means shall be provided to cut off power from the motor and apply the brake within Code requirements after the governor jaws grip the governor rope.

D. Inspector’s Operating Station:

1. 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.
   a. 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.
   b. Provide audible and visual indicators to identify activation of Phase 1 Firemen’s Service.

E. Car Door Operator:

1. Provide operators with ½ Hp motor.
2. Each door operator control circuit must be complete with accelerating circuits and door motor overload protection (circuit breaker type) in the event of a stall condition. Control circuits shall be protected with properly sized fuses.
3. Provide fuse clips, fuses, and overload protection for door operator unit and all necessary additional terminals on control panel.
4. Provide a steel support for the door operator. The support shall be designed so that no part of door operator rests directly on the cab or is supported by car door header.
5. Provide one gate switch of the shielded type, connected in series to a gate contact to prevent operation of the elevator, unless the car door is in the closed position and both devices are activated. The gate contact shall be located in the door operator limit switch mechanism and be an integral part of this mechanism. Cover plate shall have "CAPTIVE" type tamperproof stainless steel machine screws.
6. Provide a recycling device for each car door which will cause car door to open and reclose at approximately 5 second intervals whenever car door is prevented from closing fully by any obstruction. A second timer shall reopen cab door, if for any reason car does not operate after cab door has fully closed.
7. Car door operator shall be mechanically connected to car door. Friction drives will not be permitted.
8. All control relays furnished under this section shall be designed to operate quietly and conform to NEMA Standards with respect to size, spacing, voltage, carrying capacity for the contact leads and coils. Control relays shall have fine silver overlay contacts.
9. Door operator shall be wired in such a manner that when the stop switch is applied and elevator is out of the landing zone, car doors shall not open and door operator shall remain energized. When the stop switch is activated in the landing zone, the cab door shall open and power will be removed by door open limit; and if the door is closed by hand, it shall reopen.
10. The car entrance door shall be arranged so that it can be opened manually in case of emergency only when the car is within the landing zone.
11. Provide wiring and conduit complete.
12. Mount car door header angle in such a way so that if a car door of a down traveling elevator engages a fixed obstruction in the hoistway, the car canopy will not be damaged.
13. Provide car door clutches and all related equipment.

F. Door Edge Protective Device:

1. Provided with a reopening device 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.
   a. It shall be capable of self-adjustment to compensate for varying environmental conditions.

G. Light Fixture with Convenience Outlet (Top and Bottom of Car):

1. Provide light fixtures with convenience outlet. Fixture to be mounted above the car top and under the car platform and shall be wired to the lighting circuit.

H. Car and Counterweight Guide Shoes:

1. Roller guide shoes. All guide shoes shall be securely fastened to the car and counterweight at the top and bottom of the stiles and/or frame. Provide 6" rollers for the car and 3" rollers for the counterweight.
2. Provide roller guides.

I. Emergency Exit Contacts:

1. All top emergency exits shall be provided with electric contacts to prevent the operation of the car and sound an alarm when the exit door is opened.

J. Emergency Lighting System:

1. Provide an emergency car lighting system which shall provide emergency lighting using the normal elevator cab lighting and emergency power to the two (2) alarm bells as specified hereinafter.

2. The battery pack shall consist of a minimum of two (2) rechargeable batteries which shall be housed in a 18 USSG galvanized steel box with removable cover. The charger unit shall consist of a charger and inverter, which shall be housed in a separate 18 USSG galvanized steel box with removable cover. Provide a testing circuit and pilot light on the exterior of the charger unit box for testing the batteries, alarm bells and cab lights.
3. Upon interruption of normal power, the fluorescent light tubes located in the cab lighting fixture shall automatically illuminate within ten (10) seconds and permit operation of the alarm bells, subject to the activation of the emergency alarm button. The battery pack shall be capable of providing a minimum of one hour alarm operation (for three alarm bells working simultaneously) and four hours of continuous illumination. Charger shall be capable of restoring the batteries to full charge automatically within 16 hours after resumption of normal power.
4. The power pack and charger unit shall be located in the elevator machine room. Provide steel shelf/shelves of proper adequacy to support the power pack and charger unit and properly secure shelf/shelves to the machine room wall. Properly secure boxes to the steel shelve/shelves.
5. Amount and size of wires and method of connections to be in accordance with manufacturer's instructions.

2.6 FIXTURES:

A. Car Operating Panel:

1. A car operating panel shall be furnished in the car containing illuminating buttons for each landing, flush-mounted Braille tags, door open and close buttons, L.E.D. digital position indicators, telephone, emergency stop switch, F.E.R. Phase II keyswitch and indicator lights, emergency keyswitch indicator lights, alarm button and keyswitches for light, fan and independent service.
   a. All fixture components shall be mounted to a backplate and incorporated into the swing front return panel.
      1) The telephone unit shall be backplate mounted and concealed behind the swing return. Provide a perforated hold pattern in the swing return for speakers and microphone voice transmission.
      2) The light, fan an independent service keyswitch 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.
      3) An L.E.D. position indicator shall be provided in the car above the body of the main car station. The position of the car in the hoistway shall be indicated by illumination of the numeral corresponding to the floor at which the elevator is stopped or passing. Provide 2" (nominal) illuminating numbers or indicators. The lens shall be flush with the swing return.
      4) Provide black glass window for security FOB reader.

B. Illuminated Call and Car Button:

1. 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.
2. Buttons shall be brushed stainless steel.

C. Car Lanterns:

1. Car lanterns with one stroke up, two strokes down gongs shall be provided.
2. 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.
3. Provide sand blasted Plexiglas lenses without faceplates.

D. Hall Call Stations:

1. Provide 1/8” thick brushed stainless steel faceplates with beveled edges and tamper proof fasteners.
2. Include F.E.R. Phase I keyswitch and indicator at the main egress level.
3. Include unmarked emergency power indicator light.

E. Hoistway Access Switches:

1. Provide a hoistway access keyswitch at the top and bottom terminal floors for the elevator located in the jamb without a faceplate.

F. Provide hall position and direction indicators above the entrances at the main floor (designated level). The fixture shall have 2" alpha numeric indications. Provide faceplate shall be brushed stainless steel.

2.7 CAB:

A. Elevator Cab:

1. Shell - 14 gauge steel for walls and 12 gauge steel for canopy. Individual panels shall not exceed 18" in width and 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. 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. Interior Panels - Removable panel walls shall be plywood backer board covered with brushed stainless steel No. 4 finish.
3. Front Return Panels - Provide 14 gauge, brushed stainless steel full front swing return panels for both the main and auxiliary car station locations. 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 suitably re-enforced. Apply sound deadening to the back of the transom as specified above.
5. Doors - 16 gauge brushed 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 aluminum.

7. Ceiling - 16 Gauge brushed stainless steel on ¾" MDF backer board. All edges to be stainless steel.
   a. Provide LED downlighting to be integral with the suspended ceiling. 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. Provide light fixtures as specified by the Commissioner.
   b. Provide one (1) LED downlight per ceiling panel.
8. Handrails - Provide a flat bar brushed stainless steel handrail along the walls. 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 brushed stainless steel and spaced no more than 24" apart.
9. Exhaust Fan - Two-speed fan, mounted on vibration isolation pads, with battery back-up as required by Code.
10. Protection Pads - Provide one (1) set of protection pads per elevator. 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.
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 stainless steel.
13. Concealed Vent Slots - Design the cab interior to provide for ventilation openings above the base behind the wall panels.
14. Flooring - By other trades.
15. Reveals, Frieze and Other Exposed Areas - All exposed reveals, friezes, etc. shall be stainless steel with a brushed finish.
16. Engraving - No applied plates will be accepted. No manufacturer's logos shall be visible.

2.8 OTHER:

A. Card Reader/Security Provisions/Life Safety Speaker and Provisions:

1. Elevator/Security Interface Terminal Cabinet
   a. One (1) lockable interface terminal cabinet within the elevator control room. The terminal cabinet shall contain all interface terminals required for the elevator served by that control room.
   b. Terminate all interface cables to dual screw barrier type terminal strips within the interface cabinet.
   c. All wiring required from the elevator control equipment to the interface terminal cabinet.

2. Return Panel Preparation
   a. The exact card reader and camera location shall be specified by the Commissioner. The card reader and camera shall be provided by the Security trade and installed by the Contractor. The Security trade shall provide supervision, wiring details and installation diagrams to the Contractor.
3. Traveling Cable
   a. Provide six (6) pairs of 20 gauge flexible conductor low voltage cables with an overall braided shield in the traveling cable for the card reader data communication wiring. These conductors shall be terminated to a terminal strip in the junction boxes located in the control room and on top of the car.
   b. Provide two (2) RG-59/U stranded center conductor coax cables and one (1) DVS Cable Type Q in the traveling cable for CCTV camera interface. The cable shall extend from the elevator control room to the camera location in the elevator cab. An excess loop of five (5) feet of cable shall be provided at each end of the cable. Provide cable access from the top of the cab to the camera location.
   c. Traveling cables for card reader interface shall extend from the elevator/security interface terminal cabinet in the elevator control room to behind the elevator return panel. The Contractor shall terminate the cables including the drain wire to dual screw barrier terminal strips in the interface cabinet and provide 6 feet of excess cable behind the elevator return panel.
   d. Connect the cable behind the return panel to the card reader in coordination with the Security trade. The Security trade shall be responsible for wiring from the terminal strip in the interface cabinet to the security system card reader interface panel.
   e. All security cables shall be isolated from other traveling cables.
4. Conduit and Power
   a. The Contractor shall be responsible for providing all conduit and power requirements associated with the installation of the elevator terminal cabinet and interfacing to the elevator control system.
   b. The Contractor shall provide one (1) 120 V duplex unswitched outlet dedicated to security on top of the elevator.
5. Card Reader Bypass Keyswitch
   a. The bypass keyswitch shall be a maintained contract type keyswitch with the key removable in either the bypass or normal position. All bypass keyswitches shall be keyed alike.
   b. Each bypass keyswitch shall be labeled to identify its function, the secure position, and the bypass position.
6. Fire service shall override all security operations.
7. Provisions shall be made for a CCTV camera to be mounted in the ceiling of the cab. Contractor shall include any cutouts, brackets, 14 gauge tamperproof housing and GFI outlet dedicated for the CCTV camera installation and hook-up.
8. Provide a life safety speaker in the car canopy. Coordinate all requirements with the Life Safety trade.

2.9 ACCESSIBILITY 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 5”.

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”.

E. Provide an audible signal to tell passenger that the car is stopping or passing a floor served by the elevator.

2.10 AUTO DIAL TELEPHONE:

A. Provide an automatic dialing, hands free telephone in the car station. The system shall be in compliance with ADA requirement for visual and audible communications. Provide a telephone instrument master station in the control room for communications to the car and the master station.

B. The telephone shall be turned on by pressing the emergency alarm or stop switch in the car panels. It shall automatically dial a programmed number to alert the security personnel that there is a problem in the elevator. Include provisions for the phone to call a second pre-programmed number in the event no one picks up at the first number called.

C. The system shall have a ring back feature to give the ability of calls to be placed to the elevator. It shall answer the incoming call automatically and shut off after an adjustable programmed time.

D. Provide and audible and visual signal to indicate that a communication link has been established. Provide a circular drill hole pattern in car operating panel faceplate above the floor buttons.

E. Ni Cad batteries shall ensure operation under all conditions.

F. Install the instrument in the elevator and wiring within hoistway, terminating the wiring in the elevator control room. A suitable and identified junction box in the control room shall be installed.

G. All connections from the junction box to the security room's main telephone system shall be done by other trades. All electrical shall conform to Division 26 requirements.

2.11 VOICE ANNUNCIATION SYSTEM:

A. Provide a voice annunciator in the elevator. The system shall include, but not limited to:

1. Solid state digital speech annunciator.
2. A recording feature for customized messages.
3. Playback option.
4. Build-in voice amplifier.
5. Master volume control.

6. Audible indication for selected floor, floor status or position, direction of travel and nudging.

B. Locate all associated equipment in a single, clearly labeled enclosure located either in the control room and/or on car top.

PART III - 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.
   a. 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 Code.

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 control rooms, hoistways, etc., install the equipment to provide for easy access for maintenance.
12. All screws used for terminal connections of all wiring (control 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 control 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 control room, pit, 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 restoration 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 the elevator. All locks shall be mastered to one master key. Furnish four (4) master keys. Firemen's Service keys shall meet the Building Code of the City of New York's requirements.

3.3 WORKMANSHIP AND INSTALLATION:

A. Inspection and Tests:

1. 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 City of New York 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 and the Building Department of the City of New York. 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. 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 in the company of the Commissioner, 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 five percent (5%) 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 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.

B. 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 Contractor's employees shall be restored to its original condition or replaced.

C. 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.

D. 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 control 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 the elevator hoistway on all floors.

3.6 PAINTING:

A. Summary of Work Included:

1. Clean all ironwork (including all rails and brackets) 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 site.
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 to 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 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. Work of this Section includes all labor, materials, equipment, and services necessary to complete the excavation, foundation construction, filling and grading as shown on the Drawings and specified herein including, but not limited to the following:
   1. Removal of existing pavements, curbs, utilities, and former foundations 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 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 shall 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.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 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. Method Statement: Submit a detailed method statement, drawings, and calculations to be reviewed by the Commissioner. The method statement, drawings and calculations shall be prepared by a Professional Engineer licensed in the State of New York. The submittals shall include the following:
1. Earth excavation procedures.
2. Backfilling and compacting material, equipment and procedures.

D. Catalog Cuts: Submit catalog cuts and manufacturer's literature for compaction equipment, and waterproofing.

E. 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 shall 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.

F. 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.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Qualifications of Contractor for work described in this Section shall not be less than three (3) years of field experience in earthwork operations.

C. Field Testing of Fill Areas: Prepared fill lifts will be tested and approved by the Special Inspector before construction of any further work thereon. Inspection and test of subgrades and fill layers will be taken as follows:
1. Below building slabs and pit areas: For each compacted fill layer, make 1 field density test for every overlaying 2,500 sq-ft of building slab-on-grade or paved area-on-grade, but not less than 3 tests per lift. Perform field density tests in accordance with ASTM D 2922.
2. Foundation wall backfill: Take at least 3 field density tests in accordance with ASTM D 2922.

1.6 STANDARDS AND REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) standards.

B. ACI-318 latest edition-Building Code Requirements for Structural Concrete.

C. All work shall comply with requirements of the Building Code of the City of New York, requirements of the New York State Department of Labor, requirements of Occupational Safety and Health Administration (OSHA), requirements of New York State Department of Health (NYSDOH), requirements of the New York State Department of Environmental Conservation (NYSDEC), requirements of the New York City Department of Environmental Protection (NYCDEP), requirements of the New York State Department of Transportation (NYSDOT), requirements of New York City Department of Transportation (NYCDOT.

D. New York City Building Code (NYCBC), 2014 Edition.

1.7 PROJECT CONDITIONS

A. The Contractor, by careful examination, shall 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 affect the work.

B. The Contractor shall be familiar with the existing conditions of adjoining properties, utilities and buildings.

C. The Contractor shall 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 shall 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 shall secure in advance such permits as may be required.

D. 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 Commissioner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility company.
   2. Do not interrupt existing utilities during occupied hours, except when permitted in writing by the Commissioner and 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.

E. 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.

F. Compliance with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).

1.8 PROTECTION

A. The work shall 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 section occur, the Contractor shall repair such damage.

B. The above shall 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, shall be protected. Should these be disturbed in any manner, the Contractor shall have them replaced.

D. Excavation sides of any pits within the site and adjacent structure foundations shall be protected by means of adequate bracing, shoring and anchoring at all times. No site excavation shall 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 shall 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 Holidays.

1.9 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 own expense, shall 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.

1.10 SUBSURFACE STRUCTURES AND UTILITIES

A. The Contractor shall 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 shall not damage any of those utilities that are to remain and shall 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.

1.11 DESIGN OF TEMPORARY WORK

A. Temporary work shall be designed and installed so that the permanent work can be conveniently and adequately erected. Contractor shall be responsible for the adequacy of temporary work.

B. Temporary work shall be maintained in good condition.

C. Temporary work shall be changed, shifted, rebuilt, etc., as needed to suit the conditions of the permanent work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. 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 shall be 10% or less and the percent by dry weight passing the No. 100 sieve shall be 40% or less.

B. Drainage Fill: Clean natural ¾-inch crushed stone (recycled concrete shall not be used as drainage fill) having the following gradations

Sieve Size	%Passing by Weight
2 inch	100
¼ inch	25 to 60
No. 40	5 to 40
No. 200	0 to 5

C. General Fill: Shall 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.

D. Fill for utility trenches shall meet the criteria given for structural fill and shall not contain sharp, angular pieces and pieces larger than 2 inches in any dimension.

E. Before bringing any fill to the site, the Contractor shall submit the source for approval by the Commissioner, in accordance with Section 1.4 of this specification.

F. All fill materials (structural, granular, and general fill) required shall be free from wood, debris, combustible materials, vegetable matter or any material subject to decay or disintegration. Fill material shall not be contaminated.

G. The use of recycled concrete aggregate shall 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. Install all necessary protection equipment, structures such as fences, signs, scaffolding, etc. prior to start of work.

B. Remove all existing structures, utilities, pavement in accordance with the Contract Documents.

C. Protect all utility lines, which are not to be abandoned. Contractor shall be responsible for any damage to utilities that may occur.

3.3 PROTECTION AND MONITORING OF ADJACENT STRUCTURES, STREETS AND UTILITIES

A. The work shall 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 section occur, the Contractor shall repair such damage at no additional cost.

3.4 SITE DRAINAGE

A. The Contractor shall assume the responsibility for site drainage and shall 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 shall assume the responsibility for site drainage upon entering the premises and shall maintain such drainage during the course of the project so as not to adversely affect the adjacent areas.

B. The groundwater shall be maintained at least 2 ft below the subgrade level at the time of waterproofing installation and placement of concrete.

C. The Contractor shall, 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 shall 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, streets, pavements, and utilities.

E. The Contractor shall be 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 shall be modified by the Contractor at no expense to the City of New York.

G. The Contractor shall be responsible for all remedial action and associated costs due to problems arising from improper control of surface water and groundwater.

H. The Contractor shall 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 shall not conduct water to privately owned properties.

3.6 GENERAL EXCAVATION

A. The excavation shall be unclassified and shall comprise and include the satisfactory removal and legal disposal of all materials encountered regardless of the nature of the materials and shall be understood to

include, boulders, earth, hardpan, miscellaneous fill, foundations, structures, slabs, walls, utilities, pavements, curbs, piping and debris.

B. All excavation shall extend to the depths of the form and size required for the installation of the work as indicated on the drawings.

C. Excavation shall be to required elevations for bottom of pile caps, floors, pits, slabs, walls, etc. Excavation shall 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 shall 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, shall be removed from the site and legally disposed of.

E. The bottom of excavations shall be leveled and graded to receive foundations, slabs, pits, trenches and grade beams.

3.7 EXCAVATION FOR BUILDING SLABS AND STRUCTURAL MEMBERS

A. Subgrades of building slabs and structural members including framed slabs and grade beams shall be approved by the Commissioner before proceeding with their construction. Subgrades resulting from excavation shall be free of unsuitable material (fill, loose rock pieces, organics, debris, etc.) as judged by the Commissioner.

B. Where required, waterproofing shall be installed in accordance with the Contract Drawings and related specification.

C. Unauthorized Excavation: Excavations performed below the elevations shown or specified, shall be filled and compacted as hereinafter specified, at no additional cost.

D. Authorized Additional Excavation: Where the Commissioner determines that the bearing material encountered is unsuitable, remove the unsuitable bearing material. The removed material shall 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.

3.9 FILLING, GRADING AND COMPACTING

A. Filling and backfilling shall not be performed until work has been inspected by the Commissioner. All wood, paper and other deleterious materials shall be cleaned out from excavations before backfilling.

B. The filling or backfilling within the area of the building shall 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 shall be Controlled Fill as herein specified under Part 2 of these specifications. Material may be obtained from borrow sources and shall 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) shall be compacted with a vibratory plate compactor not less than 0.5 ton in static weight to the extent possible. A jumping jack shall 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. 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 shall be corrected or replaced by the Contractor at own expense.

J. Additional backfilling required to bring fill to the finished subgrades shown, shall 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 shall be brought up simultaneously and evenly on both sides.

K. The Contractor shall do all filling necessary to bring the ground surfaces to the required levels for floors, pits, and areaways as shown on the drawings.

L. Any surplus materials shall 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 shall obtain, deliver and place accepted backfill material as required.

3.10 FIELD QUALITY CONTROL

A. The Contractor shall collect samples and submit the following laboratory test reports on samples 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 Commissioner will determine the conformance of materials to be used for fills.

B. Field Inspection:
   1. All field inspections shall comply with the requirements of the New York City Building Code.
   2. Building Slab Subgrades: Special Inspector shall inspect subgrades for all building slabs. No pavement or slab shall be constructed unless the subgrade is approved by the Special Inspector.
   3. Proofrolling: Proofrolling operations shall be inspected by the Special Inspector.
   4. Backfilling and Compaction: A testing agency should be hired to verify the densities of the fill placed. The testing agency shall take field density tests of the fill placed and shall report to the Commissioner. No fill shall be placed without inspection and approval of the testing agency and the 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

A. All excess material including, earth, rock, fill, shall be removed from site and legally disposed of.

B. All lumber, forms and metal work shall be removed immediately after completion of work in local areas. The Contractor shall be responsible for removal of all debris produced by work to this section from the site.

C. Sidewalk and streets adjoining the property shall 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 23 00

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SECTION 32 13 13 - CONCRETE PAVING

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 curbs and walks.
2. Reinforcement.
3. Joint fillers.

B. Related Sections

1. Section 03 30 00 “Cast-in-Place Concrete”
2. Section 07 92 00 “Joint Sealants”

1.3 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Furnish test reports and materials certification as required in Section 03 30 00 “Cast-in-Place Concrete”

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 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 FORMS

A. Provide steel or wood of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

B. Use flexible spring steel forms or laminated boards to form radius bends.

2.2 REINFORCEMENT

A. Provide welded wire mesh conforming to ASTM A 185, 6 x 6, ten (10) gauge.

2.3 CONCRETE

A. Concrete Materials

1. Comply with the applicable requirements of Section 03 30 00 “Cast-in-Place Concrete”.

2. All concrete work of this Section shall contain five (5) percent to seven (7) percent entrained air and shall be air entrained with air entraining agent; "Air-Mix" by Euclid Chemical Company, or equal by Master Builders, GCP Applied Technologies or approved equal. Agent shall conform to ASTM C 260 and shall be mixed with concrete in accordance with manufacturer's instructions.

B. Concrete Mix, Design and Testing: Comply with applicable requirements of Section 03 30 00 “Cast-in- Place Concrete” for concrete mix design, sampling and testing, and quality control, and as herein specified. Design the mix to produce standard-weight concrete consisting of Portland cement, aggregate, air-entraining admixture and water to produce the following properties:

1. Compressive Strength: Four-thousand five hundred (4500) psi, minimum at twenty-eight (28) days, with a water cement ratio not to exceed 0.45 by weight.

2. Slump Range: Two (2) inches to four (4) inches.

3. Air Content: Five (5) percent to seven (7) percent.

2.4 JOINT FILLER

A. Gasket: For joint fillers in concrete work, provide closed cell extruded neoprene gasket conforming to ASTM C 509, Grade 4, black.

B. Sealant: Two (2) part self-leveling polyurethane sealant complying with ASTM C 920, Type M, Class 25, Grade P&NS; Sikaflex-2c NS/SL by Sika Chemical Co., or equal by Tremco, Pecora or approved equal. Color of sealant as selected by the Commissioner.

C. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

2.5 CURING

A. Cure concrete with curing compound conforming to ASTM C 309 and Fed. Spec. TT-C-800A, modified with thirty (30) percent solids; "Kurez W VOX" by the Euclid Chemical Company or comparable product by Master Builders, GCP Applied Technologies or approved equal.

2.6 WATER REDUCING MIXTURE

A. Provide water reducing and densifying admixture; "Eucon WR-75" by the Euclid Chemical Company or comparable product by Master Builders, GCP Applied Technologies or approved equal.

B. The admixture shall conform to ASTM C 494, Type A, and not contain any lignosiliconates nor more than one (1) percent chloride ions.

PART 3 EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 SURFACE PREPARATION

A. Remove loose material from the compacted sub-base surface immediately before placing concrete.

B. Proof roll prepared sub-base surface to check for unstable areas and the need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.3 FORM CONSTRUCTION

A. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of the work and so that forms can remain in place at least twenty-four (24) hours after concrete pavement.

B. Check completed formwork for grade and alignment to the following tolerances:

1. Tops of forms not more than 1/8" in ten (10) feet.

2. Vertical face on longitudinal axis, not more than 1/4" in ten (10) feet.

C. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

3.4 REINFORCEMENT

A. Locate, place, and support reinforcement as specified in Section 03 30 00 “Cast-in-Place Concrete”.

3.5 CONCRETE PLACEMENT

A. Comply with the requirements of Section 03 30 00 “Cast-in-Place Concrete” for mixing and placing concrete.

B. Do not place concrete until sub-base and forms have been checked for line and grade. Moisten sub-base if required to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at required finished elevation and alignment.

C. Placing Concrete

1. Place concrete using methods which prevent segregation of the mix. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square faced shovels for hand spreading and consolidation.

2. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

D. Curbs: Automatic machine may be used for curb placement. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed the minimums herein specified. Machine placement must produce curbs to the required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.

3.6 JOINTS

A. Construct expansion, weakened plane (contraction), and construction joints true to line with face perpendicular to surface of the concrete. Construct transverse joints at right angles to the centerline.

B. Weakened Plane Joints: Provide weakened plane (contraction) joints, sectioning concrete into areas as shown on the Drawings. Construct weakened plane joints for a depth equal to at least 1/4 concrete thickness.

C. Construction Joints: Place construction joints at the end of all pours and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such pours terminate at expansion joints. Use standard metal keyway section forms.

D. Expansion Joints

1. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.

2. Locate expansion joints at thirty (30) feet o.c. for each pavement lane, unless otherwise indicated.

3. Extend joint fillers full width and depth of joint, and not less than 1/2" or more than one (1) inch below finished surface where joint sealer is required. If no joint sealer required, place top of joint filler 1/8" below finished concrete surface.

4. Furnish joint fillers in one-piece lengths for the fill width being placed wherever possible. Where more than one length is required, adhere joint filler sections together.

5. Protect the top edge of the joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

6. Fillers and Sealants: Apply sealant over expansion joint where occupied space occurs below the walk. Comply with the requirements of Section 07 92 00 “Joint Sealants” for preparation of joints and installation, including priming of joints and backer rod.

3.7 CONCRETE FINISHING

A. After consolidating and striking off concrete, level the surface by darbying or bull floating. After the concrete has stiffened sufficiently to permit the operation and the surface sheen has disappeared, the surface shall be floated. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.

B. After floating, test surface for trueness with a ten (10) foot straight edge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate any tool marks on concrete surface.

D. After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing by drawing a fiber bristle broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to the Commissioner.

E. Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the Commissioner.

3.8 CURING

A. Protect and cure finished concrete paving, complying with applicable requirements of Section 03 30 00 “Cast-in-Place Concrete”. Use curing compound specified herein applied in accordance with manufacturer's instructions.

3.9 PROTECTION

A. Protect concrete from damage until Substantial Completion. Exclude traffic from pavement for at least fourteen (14) days after placement. No construction traffic is permitted.

END OF SECTION 32 13 13

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CONTRACT # 2

PLUMBING WORK

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SECTION 22 00 13 – PLUMBING 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 **$5,000.00** for the **Plumbing 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 (cumingtonite-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 Plumbing 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 Plumbing 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 then 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"	l4”	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 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = 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 Plumbing 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 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 individual Division 22 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. 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.

B. 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 individual 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 individual 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.

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".

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 220553 "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:

    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:

    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:

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:

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:

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

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: Subject to compliance with requirements, provide products by one of the following:

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: Subject to compliance with requirements, provide products by one of the following:

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: Subject to compliance with requirements, provide products by one of the following:

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: Subject to compliance with requirements, provide products by one of the following:

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: Subject to compliance with requirements, provide product by one of the following:

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-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 (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, 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 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 scre.
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 surface 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.

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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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 Product: 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. Approved equal.

2. Joint Sealants for Polystyrene Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: Subject to compliance with requirements, provide one of 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. Product: 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. 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. Product: 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. 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. Product: Subject to compliance with requirements, provide one of 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. Product: 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. 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. Product: Subject to compliance with requirements, provide one of 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) GEMCO.
      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. Product: Subject to compliance with requirements, provide one of 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-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-thick, aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

   a. Product: Subject to compliance with requirements, provide one of the following:

      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 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. Manufacturers: Subject to compliance with requirements, provide products by one of 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, provide products by one of 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-presized jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized 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 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 as following:

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.

B. Domestic Cold Water: Insulation must be as 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: 1 inch for all pipes including branches up to and including 1-1/4”; 1.5 inch for pipes 1-1/2” and up. 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 in finish areas:

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 22 07 00

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 facility’s operations and maintenance staff.
4. Verify that the facility’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 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 facility's maintenance personnel to adjust, operate, and maintain specific equipment.
6. Instruct the facility'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 contractors 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 facility'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 General Contractor, Plumbing Contractor, 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 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. Electric Hot Water Heater
2. Instantaneous Electric Hot Water Heaters
3. Domestic Water Booster Pumps
4. Sump Pumps
5. Sewage Ejector Pumps
6. Hot Water Circulator Pumps
7. Expansion Tank
8. Associated Plumbing Specialties

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 FACILITY’S 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 facility’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: Subject to compliance with requirements, provide products by one of the following:

1. Amcast Industrial Corporation; Lee Brass Co.
2. Ford Meter Box Company, Inc. (The); Pipe Products Div.
3. Jones, James Company.
4. Master Meter, Inc.
5. McDonald, A. Y. Mfg. Co.
6. Mueller Co.; Water Products Div.
7. Red Head Manufacturing & Supply.
8. 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 Division 22.

B. Manufacturers:

1. Basis-of-Design Product: Subject to compliance with NYC DEP requirements, provide NYC DEP water meter Elster 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 where required by meter manufacturer.

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:

1. Hard Copper Tube: "Lead-Free" certified, ASTM B 88, Type K water tube, drawn temper.
2. 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:

1. Hard Copper Tube: "Lead-Free" certified, ASTM B 88, Type L water tube, drawn temper.
2. 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 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. Post Hydrants.
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 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. Febco.
b. AMES.
c. Watts.
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 DABG or comparable product by one of the following:

    a. Febco.
    b. AMES.
    c. Watts.
    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 ¾" 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 LV-982-LF 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.

10. Tempered-Water Design Flow Rates: Varies.
11. Valve Finish: Rough bronze.
12. 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. Or 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. Or 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 POST HYDRANTS

A. Basic-of-Design Product: Subject to compliance with requirements, provide bronze with aluminum casing guard and secured wheel handle, non-freeze Post Hydrants J.R. Smith Model 5910-WH-AG 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. Or 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: Secured Wheel Handle.
4. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
5. Inlet: NPS 3/4 (DN 20).
6. Dain hole in casing – Required.
7. Depth of bury: 48” minimum.

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. MIFAB, Inc.
   b. PPP Inc.
   c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   d. Watts Drainage Products Inc.
   e. Zurn Plumbing Products Group; Specification Drainage Operation.
   f. 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 bathrooms where shown on contract drawings:

1. Basis-of-design Product: Subject to compliance with requirements, provide trap primer J. R. “Trap-Defender” 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 and where shown on contract drawings:

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

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, will 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. Facility's 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 facility's maintenance personnel to adjust, operate, and maintain packaged booster pumps.

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. Basic piping installation requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."

B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

C. 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."

D. 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."

E. 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."

F. 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.

G. 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.

H. 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.

I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

J. Do not enclose, cover, or put piping into operation until it is inspected and approved by NYC DOB.

K. 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

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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. Standpipe.
4. Roof flashing assemblies.
5. Miscellaneous sanitary drainage piping specialties.
6. Flashing materials.
7. Backwater valves.
8. Grease Interceptor.

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: Subject to compliance with requirements, provide products by one of the following:

   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. Tyler Pipe; Wade Div.
   c. Watts Drainage Products Inc.
   d. Zurn Plumbing Products Group; Specification Drainage Operation.
   e. 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: Subject to compliance with requirements, provide products by one of the following:

   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. Tyler Pipe; Wade Div.
   c. Watts Drainage Products Inc.
   d. Zurn Plumbing Products Group; Specification Drainage Operation.
   e. 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: Subject to compliance with requirements, provide products by one of the following:

    a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    b. Tyler Pipe; Wade Div.
    c. Watts Drainage Products Inc.
    d. Zurn Plumbing Products Group; Specification Drainage Operation.
    e. 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. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
2. Watts Drainage Products Inc.
3. Zurn Plumbing Products Group; Light Commercial Operation.
4. 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. MIFAB, Inc.
2. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
3. Watts Drainage Products Inc.
4. Zurn Plumbing Products Group; Light Commercial Operation.
5. 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 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.

2.5 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.

2.6 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. Tyler Pipe; Wade Div.
   b. Watts Drainage Products Inc.
   c. Zurn Plumbing Products Group; Specification Drainage Operation.
   d. 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.

2.7 INTERCEPTORS

A. Grease Interceptors:

1. Subject to compliance with requirements, provide grease interceptor with acid resistant coating Model 8007-ARIO-AC manufactured by J.R.Smith or a comparable product by one of the following manufacturers:

   a. Wade.
   b. Mifab.
   c. Or approved equal.

2. Interceptor shall be made of fabricated steel acid resistant coating inside and outside and aluminum cover.
3. Flow Rate: 7 gpm.
4. Grease Cap: 14 lbs.
5. Size: 8.5”x19”x11”
6. End Connections: 3” No-hub.
7. Installation: Install on 4” concrete hose pad.
8. Cover: aluminum

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 221329 - SANITARY SEWERAGE 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 the following sewage pumps and accessories for sanitary drainage piping systems in buildings:

1. Submersible sewage pumps.

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 sewage 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, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 SUBMERSIBLE, SEWAGE PUMPS

A. Basis-of-Design Product: Subject to compliance with requirements, provide factory-assembled and -tested, duplex, single-stage, centrifugal, end-suction, submersible, sewage pumps Model VSS-4A--4 as manufactured by Federal Pump or comparable products from the following:

1. Flygt; ITT Industries.
2. Goulds Pumps; ITT Industries.
3. Weil Pump Company, Inc.
4. Zoeller Company.
5. Approved Equal

B. Casting: Cast iron, with open inlet, legs that elevate pump to permit flow into impeller, and vertical discharge with companion flange for piping connection.

C. Impeller: ASTM A 48/A 48M, Class No. 25 A or higher cast iron; statically and dynamically balanced, slicer type, non-clog design and capable of handling solids; overhung, single suction, and keyed and secured to shaft.

D. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings and double mechanical seals.

E. Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

F. Pump Discharge Piping: Factory or field fabricated, ASTM A 53/A 53M, Schedule 40, galvanized-steel pipe.

G. Pit Cover: Gas-tight, coated steel and suitable to support controls, with gas-tight openings for the pumps and piping.

H. Controls: Pump control shall be by a type SBS submers-a –buld contrioller, including four mercury bulbs on suspension bracket. A NEMA-4 junction box shall be provided. Control panel in NEMA-1 wall-mounting enclosure shall be provided. Control panel shall include disconnect circuit breaker, magnetic starter foe each pump, silencer switch, automatic pump alternator, pump-run lights, alarm bell, light to indicate high water condition and auxiliary dry contact for connection to BMS system.

I. HWA and power failure conditions shall be reported to BMS.

2.2 SEWAGE PUMP PITS

A. Description: Concrete pit with sump, pipe connections, curb frame, and separate cover.

B. Curb Frame and Cover:

1. Curb Frame Material: Galvanized steel or steel with bituminous coating.

a. Pattern: Z-cross-section shape with raised outer rim of height matching cover, for recessed mounting with installed cover flush with top of floor slab.

2. Cover: Fabricate with openings having gastight gaskets, seals, and bushings; for access to pumps, pump shafts, control rods, discharge piping, vent connections, and power cables.

a. Material: Cast iron or steel with bituminous coating.
b. Reinforcement: Steel or cast iron, capable of supporting foot traffic for basins installed in foot-traffic areas.

2.3 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. Hyspan Precision Products, Inc.
4. Mercer Rubber.
5. Metraflex, Inc.
6. Or Approved Equal.

B. Description: 125-psig minimum working-pressure rating and ends matching pump connections:

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 INSTALLATION

A. Excavating, trenching, and backfilling are specified in Division 312300 “Excavation and Fill”.

B. Install sewage 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 sewage pumps on pit floors. Make direct connections to sanitary drainage piping.

1. Anchor guide-rail supports to pit bottoms and sidewalls or covers. Install pumps so pump and discharge pipe disconnecting flanges make positive seals when pumps are lowered into place.

E. Install sewage pump basins and connect to drainage and vent 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 sewage pump pits and connect to drainage and vent 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 221316 "Sanitary Waste and Vent Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

I. Install piping adjacent to sewage pumps to allow service and maintenance.

J. Connect sanitary drainage and vent piping to pumps. Install discharge piping equal to or greater than size of pump discharge piping. Install vent piping equal to or greater than size of pump basin vent connection. Refer to Division 22 Section 221316 "Sanitary Waste and Vent 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. Refer to Division 22 Section 220523 "General-Duty Valves for Plumbing Piping" for general-duty valves for sanitary waste 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."

END OF SECTION 221329

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. Aboveground storm water house drains (from bottom of the riser in cellar to house trap) must be:

1. Service weight, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

C. Aboveground storm drainage piping, except as noted in paragraph B, shall be:

1. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and coupled joints.

D. Underground storm drainage piping must be:

1. Extra heavy, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

E. Sump pump discharge:

1. Galvanized steel pipe, Schedule 40, drainage fittings, and threaded joints.

3.3 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Division 22 Section 220500 "Common

Work Results for Plumbing."

B. 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."

C. 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."

D. Install wall-penetration-fitting system at each service pipe penetration through foundation wall. Make installation watertight.

E. 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."

F. 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.

G. 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.

H. 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.

I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

J. 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 valves 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 Edition.

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. Roof Drains.
4. Area Drains.

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.

1.5 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: 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 ROOF AND AREA DRAINS

A. Cast-Iron Control Flow Roof Drains (RD):

1. Basis-of-Design Product: Subject to compliance with requirements, provide roof drains, J.R.Smith Control-Flo Model 1083-DX-E-R-C2 or a comparable product by one of the following:

a. MIFAB, Inc.
b. Tyler Pipe; Wade Div.
c. Watts Drainage Products Inc.
d. Approved Equal

2. Standard: ASME A112.21.2M.
3. Pattern: Roof drain.
4. Body Material: Cast iron.
5. Dimensions of Body: 15-1/4”.
6. Combination Flashing Ring and Gravel Stop.
7. Flow-Control Weirs: Required as per approved sewer connection proposal.
8. Outlet: Bottom or Side.
9. Dome Material: Cast iron.
10. Extension: Required, height to be coordinated with insulation.
11. Underdeck Clamp: Required.
12. Sump Receiver: Required.
13. Dome: Cast Iron.

B. Cast-Iron Emergency Roof Drains (ERD):

1. Basis-of-Design Product: Subject to compliance with requirements, provide roof drains J.R. Smith Model 1080-DX-E-R-C2–W2 or a comparable product by one of the following:
    a. MIFAB, Inc.
    b. Tyler Pipe; Wade Div.
    c. Watts Drainage Products Inc.
    d. Approved Equal

2. Standard: ASME A112.21.2M.
3. Pattern: Roof drain.
4. Body Material: Cast iron.
5. Dimensions of Body: 15-1/4”.
6. Combination Flashing Ring and Gravel Stop.
7. Flow-Control Weirs: Not required.
8. Solid Water Dam: 2”
9. Outlet: Bottom or Side.
10. Dome Material: Cast iron.
11. Extension: Required, height to be coordinated with insulation.
12. Underdeck Clamp: Required.
13. Sump Receiver: Required.

C. Area Drains in paved areas (AD):

1. Basis-of-Design Product: Subject to compliance with requirements, provide area drains J.R.Smith Model 1410-C-R-HP-NB or a comparable product by one of the following:

    a. Josam Company; Josam Div.
    b. MIFAB, Inc.
    c. Tyler Pipe; Wade Div.
    d. Watts Drainage Products Inc.
    e. Zurn Plumbing Products Group; Light Commercial Operation.
    f. Zurn Plumbing Products Group; Specification Drainage Operation.
    g. Or Approved Equal.

2. Standard: ASME A112.21.2M.
3. Pattern: Area drain.
4. Body Material: Cast iron.
5. Dimensions of Body: 15-3/4”.
6. Perforated Stainless Steel Extension with Secondary flashing Clamp.
7. Flow-Control Weirs: Not required.
8. Solid Water Dam: Not required.
9. Outlet: Bottom.
10. Top Material: Heelproof, Nickel Bronze.
11. Extension Collars: Required.
12. Underdeck Clamp: Not Required.
13. Sump Receiver: Required.

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 Stancor Traction-Minder Model WSE-50 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 4X control panel with HOA switch, pump run light and dry contact for connectivity.

I. Controls: Three floats – on, off and high water- must be pre-assembled at the factory.

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 Section 31 2300 “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 Section 260526 "Grounding and Bonding for Electrical Systems."

L. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

M. Refer to Section 220523 "General-Duty Valves for Plumbing Piping" for general-duty valves for drainage piping.

END OF SECTION 221429

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: Low-boy, 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, ASME construction.
5. Energy Management System Interface: Normally closed dry contacts for enabling and disabling water heater.
6. Capacity and Characteristics WH-1

a. Capacity: 50 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 CIRCULATORS

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 facility'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. Lavatories.
9. 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 US DOJ’S 2010 ADA Standards for Accessible Design and 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 WaterSence 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.

I. 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.

J. 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. ABS: Acrylonitrile-butadiene-styrene plastic.

B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

C. FRP: Fiberglass-reinforced plastic.

D. PMMA: Polymethyl methacrylate (acrylic) plastic.

E. PVC: Polyvinyl chloride plastic.

F. 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-H; L, L-2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant electronic battery-operated metering faucet TOTO Eco Power Model TEL 115-D10ET-CP or comparable product by one of the following:

a. American Standard Companies, Inc.
b. Delta Faucet Company.
c. Kohler Co.

d. Or Approved Equal.

2. Description: ADA Compliant, metering:

a. Body Material: Commercial, solid brass.
b. Finish: Polished chrome plate.
c. Maximum Flow Rate: 0.5 gpm/ 0.09 gallon/ cycle.
d. Centers: Single.
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.
j. Tempering Device: n/a
k. Variation: n/a
l. Transformer: n/a
m. Time Out Setting: 10 seconds.
n. Cycle: 0.09 gallon per cycle.
o. Provide with thermostatic mixing valve.
p. Operation: electronic, battery powered.

2.2 SINK FAUCETS

A. Pantry Sink Faucet, PS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant manual faucet Elkay Allure Model LK7921 SSS or comparable product by one of the following:

a. American Standard Companies, Inc.
b. Delta Faucet Company.
c. Kohler Co.
d. Or Approved Equal.

2. Description: ADA Compliant, metering:

a. Body Material: Commercial, solid brass.
b. Finish: Polished chrome plate.
c. Maximum Flow Rate: 1.5 gpm.
d. Centers: Single.
e. Mounting: Deck, exposed.
f. Valve Handle(s): Lever.
g. Inlet(s): NPS 3/8.
h. Spout: Rigid type.
i. Drain: Stainless Steel basket strainer with drain assembly.
j. Tempering Device: n/a
k. Variation: n/a
l. Transformer: n/a

m. Time Out Setting: 10 seconds.
n. Operation: Manual.

B. Pantry Sink Cold Water Dispenser, PS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant faucet Dornbracht Model 17500661-00010 or comparable product by one of the following:

a. American Standard Companies, Inc.
b. Delta Faucet Company.
c. Kohler Co.
d. Or Approved Equal.

2. Description: ADA Compliant, metering:

a. Body Material: Commercial, solid brass.
b. Finish: Polished chrome plate.
c. Maximum Flow Rate: 0.5 gpm.
d. Centers: Single.
e. Mounting: Deck, exposed.
f. Valve Handle(s): Lever.
g. Inlet(s): NPS 3/8.
h. Spout: Rigid type.
i. Drain: n/a.
j. Tempering Device: n/a
k. Variation: n/a
l. Transformer: n/a
m. Time Out Setting: n/a.
n. Cycle: n/a.
o. Operation: Manual.

C. Mop Sink, MS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant manual faucet Chicago Faucets Model 897-CCP or comparable product by one of the following:

a. American Standard Companies, Inc.
b. Delta Faucet Company.
c. Kohler Co.
d. Or Approved Equal.

2. Description: ADA Compliant, metering:

a. Body Material: Commercial, solid brass.
b. Finish: Chrome plate.
c. Maximum Flow Rate: 2.2 gpm.
d. Centers: 8”.

e. Mounting: Wall, exposed.
f. Valve Handle(s): Lever.
g. Inlet(s): NPS 3/8.
h. Spout: Rigid type.
i. Drain: Grid Strainer.
j. Tempering Device: n/a
k. Variation: n/a
l. Transformer: n/a
m. Time Out Setting: N/A.
n. Cycle: N/A.
o. Operation: Manual.
p. Provide with integral vacuum breaker.
q. Accessories: provided with pail hook and wall brace.

2.3 FLUSHOMETERS

A. Flushometers, WC, WC-H:

1. Basis-of-Design Product: Subject to compliance with requirements, provide sensor operated, battery powered flushometer American Standard Selectronic Model 6065.111 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, Electronic, battery-operated 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: Electronic.
e. Consumption: 1.1 gal./flush.
f. Tailpiece Size: NPS 1-1/2 (DN 40).

2.4 SHOWERS, SH:

A. Shower Faucets, SH:

1. Basis-of-Design Product: Provide ADA compliant, shower unit Acorn Shower-Ware Model 450 BADA-5-8-W-LVR with Flow Control Handheld 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: Temperature and Pressure thermostatic ntegral 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, SH:

1. Basis-of-Design Product: Subject to compliance with requirements, provide precast terrazzo one piece receptor for wheelchair accessibility FIAT Model ADAWN6036 or comparable product by one of the following:

a. American Standard Companies, Inc.
b. Kohler Co.
c. Zurn Plumbing Products Group.
d. Or Approved Equal.

C. Shower Drain in shower basin: comply with specification Section 221319 “Sanitary Waste Piping Specialties”.

2.5 TOILET SEATS

A. Toilet Seats, WC, WC-H:

1. Basis-of-Design Product: Subject to compliance with requirements, provide toilet seat Olsonite Model 95CT or comparable product by one of the following:

a. Bemis Manufacturing Company.
b. Church Seats.
c. 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 comparable product by one of the following: 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. Carrier shall be compact type to fit into plumbing chases.

C. Lavatory Supports, L:

1. Description: Type II, lavatory carrier with coated concealed arms, tie rod and floor mounted uprights. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

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 3351.101 or a comparable product by one of the following:

   a. Kohler Co.
   b. TOTO USA, Inc.
   c. 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: 1.1 gal./flush.
   d. Color: White.
   e. Spud: 1-1/2” top inlet spud.

4. Toilet Seat: WC.

2.9 LAVATORIES

A. Lavatories, L, L-H:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant lavatory Duravit Model 0454500027 or a comparable product by one of the following:

   a. TOTO USA, Inc.
   b. American Standard, Inc.
   c. Kohler
   d. Or Approved Equal.

2. Description: Accessible, wall-mounting, enameled cast iron, with overflow.

   a. Type: Wall Mounted.
   b. Size: 20-5/8” by 18-1/2” inches (508 by 457 mm) rectangular.
   c. Faucet Hole Punching: single.
   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: polish chrome plated, p-trap with trap primer.
l. Fixture Support: Lavatory L.
m. Provide protective shielding for water supplies and drain.

B. Lavatories, L-2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant undermount lavatory Dayton Model DCFU12FB or a comparable product by one of the following:

a. TOTO USA, Inc.
b. American Standard, Inc.
c. Kohler
d. Or Approved Equal.

2. Description: Accessible, undermount, stainless steel.

a. Type: Undermount.
b. Size: 14-3/8" round.
c. Faucet Hole Punching: n/a
d. Faucet Hole Location: n/a.
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: Center.

j. Drain Piping: NPS 2" chrome-plated, cast-brass P-trap; tubular brass waste to wall and wall escutcheon.
k. P-trap with Trap Primer: polish chrome plated, p-trap with trap primer.
l. Fixture Support: Lavatory L.
m. Provide protective shielding for water supplies and drain.

2.10 SINKS

A. Pantry Sink, PS:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ADA compliant undermount sink Elkay Model ELUHAD121250 or a comparable product by one of the following:

    a. TOTO USA, Inc.
    b. American Standard, Inc.
    c. Kohler
    d. Or Approved Equal.

2. Description: Accessible, undermount, stainless steel 16 gauge 304.

    a. Type: Undermount.
    b. Size: 14-1/2" rectangular.
    c. Faucet Hole Punching: n/a.
    d. Faucet Hole Location: n/a.
    e. Pedestal: Not required.
    f. Color: stainless steel.
    g. Faucet: Sink PS.
    h. Supplies: NPS 3/8 (DN 10) chrome-plated copper with stops.
    i. Drain: Grid.

        1) Location: rear.

    j. Drain Piping: NPS 1-1/2 by NPS 2 chrome-plated, cast-brass P-trap; tubular brass waste to wall and wall escutcheon.
    k. P-trap with Trap Primer: polish chrome plated, p-trap.
    l. Fixture Support: Sink PS.
    m. Provide protective shielding for water supplies and drain.

B. Mop Sink

1. Subject to compliance with requirements, provide 16-gauge 304 stainless steel service basin Elkay Model EFS3321C or a comparable product by one of the following:

    a. Kohler Co.
    b. Eljer.
    c. Advance Tabco.
    d. Or approved equal.

2. Description: Stainless streel basin. Provide with wide mop hanger.

    a. Overall Dimensions: 33"x 21"x8"
    b. Sink Faucet: MS.
    c. Supplies: NPS 1/2 (DN 15) chrome-plated copper with stops.
    d. Drain: NPS 3 (DN 80) flat grid strainer, stainless steel.
    e. Provide with wide mop hanger.

2.11 DRINKING FOUNTAIN WITH BOTTLE FILLING STATION.

A. Drinking Fountain, DF-H:

1. Basis-of-Design Product: Subject to compliance with requirements, provide drinking fountain Halsey-Taylor Model HTHB-HRF-RFSEBP-I wall mount fountain Barrier-Free with bottle filler, filer kit and stainless steel access panel 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.
e. Filter: Provide filer kit.
f. Access Panel : Provide stainless steel access cover for the filter kit.

PART 3 - EXECUTION

3.1 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."

3.2 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."

3.3 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.

3.4 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 224000

SECTION 231123 – FACILITY NATURAL GAS 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. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves.
5. Pressure regulators.

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: For natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

C. Seismic-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a professional engineer licensed in the State of NY.

1. Detail fabrication and assembly of seismic restraints.
2. Design Calculations: Calculate requirements for selecting seismic restraints.

D. Welding certificates.

E. Operation and Maintenance Data: Submit for booster system, valves and gas pressure regulators installation instructions, spare parts lists, and exploded assembly views.

F. Field quality-control reports.

G. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 014000 “Quality Requirements”.

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code. Work of this section to be performed by a licensed plumber meeting all rules and regulations of the City of New York.

1.6 WARRANTY

A. Manufacturer shall provide products warranty extending 12 months from date of substantial completion.

1.7 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 150 psig minimum unless otherwise indicated.
2. Service Regulators: 150 psig minimum unless otherwise indicated.

B. Natural-Gas System Pressure within Buildings: 0.5 psig (3.45 kPa) or less.

C. Provide restraints and anchors for natural-gas piping and equipment, including comprehensive engineering analysis by a professional engineer licensed in the State of NY, using performance requirements and design criteria indicated.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings for pipes 4” and smaller: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings for pipes 5” and larger: ASTM A 234/A 234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Joints: Threaded for pipes 4” and smaller; welded for pipes 5” and larger.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.
5. Operating-Pressure Rating: 0.5 psig
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches.

B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

1. Copper-alloy convenience outlet and matching plug connector.
2. Nitrile seals.
3. Hand operated with automatic shutoff when disconnected.
4. For indoor or outdoor applications.
5. Adjustable, retractable restraining cable.

C. Y-Pattern Strainers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mueller Steam Specialty.
   b. O.C. Keckley Company.
   c. Spirax Sarco, Inc.
   d. Or approved equal.

2. 2 inch and Smaller: Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32-inch stainless steel perforated screen.

3. 2-1/2 inch to 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64-inch stainless steel perforated screen.

4. 5 inch and Larger: Flanged iron body for 175 psig working pressure, basket pattern with 1/8-inch stainless steel perforated screen.

D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. 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.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F (540 deg C) complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 VALVES

A. Manual Shut-off Valves Inside Building.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Nordstrom.
2. Hammond.
3. Nibco.
4. Approved equal.

C. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves where required by Con. Ed.
5. Listing: Listed and labeled by an NRTL for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
7. Threaded cast iron body, 125 PSIG wog

D. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves where required by Con. Ed.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
5. 2½ in. to 4-in.: Flanged cast iron body lubricated tapered plug type, 175 PSIG wog.
6. 6 in. and larger: Flanged cast iron body lubricated tapered plug type, 200 PSIG wog, worm gear operated.

E. Provide 2 wrenches for each size used.

1. Attach wrench to each valve.

F. Ball Valves

1. On local branches three inches and smaller, provide threaded three-piece full port wafer-type ball valve with bronze body, ball stem, Teflon seats, and level handles, 300 PSIG wog.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BrassCraft.
b. Conbraco.
c. NIBCO.
d. Or approved equal.

G. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP

1. 2 inch and smaller: Threaded brass ball valves with full port TFE sears and blowout proof stem, 600 psig wog.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BrassCraft.
b. Conbraco.
c. NIBCO.
d. Or approved equal.

3. Body: Bronze, complying with ASTM B 584.
4. Ball: Chrome-plated bronze.
5. Stem: Bronze; blowout proof.
6. Seats: Reinforced TFE; blowout proof.
7. Packing: Threaded-body packnut design with adjustable-stem packing.
8. Ends: Threaded, flared, or socket.
9. CWP Rating: 600 psig.
10. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL.
11. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

H. Check Valves:

1. Provide bronze body swing disc check valve.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eclipse Series 1000.
b. Flomatic Corporation.
c. Hammond
d. Or approved equal.

I. Bronze Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond.
b. Lee Brass Company.
c. NIBCO.
d. Or approved equal.

2. Body: Bronze, complying with ASTM B 584.

3. Plug: Bronze.
4. Ends: Threaded, socket, or flanged.
5. Operator: Square head or lug type with tamperproof feature where indicated.
6. Pressure Class: 125 psig.
7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL.
8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

J. Cast-Iron, Non-lubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. McDonald.
   b. Mueller Co.
   c. Xomox Corporation.
   d. Or approved equal.

2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated on plans.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

K. Cast Lubricated Plug Valves Inside Building:

1. 2-inch and smaller:

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cast iron body, threaded Nordstrom Valves, Inc. Figure 114.
      2) Nibco Valves
      3) Mueller Valve
      4) Or approved equal.

2. 2½ inch to 4-inch:

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Flanged cast iron body lubricated tapered plug type, 175 PSIG wog, Nordstrom Valves, Inc. Figure 115.
      2) Nibco Valves.
      3) Mueller Valves.
      4) Or approved equal.

3. Valves 2 ½ inch and larger shall be flanged.

4. Provide 2 wrenches for each size used.
5. Attach wrench to each valve.
6. Gas Cocks:

   a. Gas cocks shall be for use only as manual gas shut-off valves at each piece of gas burning equipment; shall be of the plug type, bronze construction with check, nut and washer bottom and tee handle.

   b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) A.Y. McDonald Mfg. Co. Figure 10596.
      2) Conbraco Industries, Inc. Series 52.
      3) Nibco.
      4) Or approved equal.

   c. Gas cocks shall only be used on piping 1 inch and smaller.

2.5 GAS SAFETY SHUTOFF VALVES

A. Gas safety shut-off valves shall be FM & UL listed, electric motor operated, normally closed, manual reset type. Valves shall be rising stem design with a straight through flow path with metal-to-metal seat and disc arrangement. The valve seat shall be stainless steel and the disc ductile iron. Valves shall be provided with a NEMA 4 enclosure modified for Class I, Division II hazardous locations, be provided with an electrical terminal block and shall operate on 120 Volt, A.C., 60 Cycles, single phase. Valves shall meet ANSI Class VI leakage standard and shall be provided with a visual indicator to note the position of the valve whether "OPEN" or "SHUT".

B. Gas safety shut-off valves 2" and smaller shall be threaded, 2 1/2" and larger shall be flanged. Flanged valves shall be provided with companion flange set by valve manufacturer.

   1. Gas safety shut-off valves 2" and smaller:

      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

         1) Maxon Corporation.
         2) Asco.
         3) Redhat.
         4) Or Approved Equal.

   2. 2 1/2" and larger. All valves shall be provided with trim package 1-1.

      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

         1) Maxon Corporation.
         2) Asco.
         3) Redhat.
         4) Or Approved Equal.

C. Gas safety shut-off valves shall be installed in the following locations:

1. On the firm gas line downstream of its meter and before any branch take-offs.

D. Gas safety shut-off valves shall be wired to the gas leak detection system and shall function to shut off all gas supply to the building upon:

1. Action of the gas leak detection system (alarm condition), and,
2. Loss of normal electrical power.

2.6 DIELECTRIC UNIONS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Capitol Manufacturing Company.
2. Central Plastics Company.
3. Hart Industries International, Inc.
4. McDonald, A. Y. Mfg. Co.
5. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
6. Wilkins; Zurn Plumbing Products Group.
7. Or approved equal.

B. Minimum Operating-Pressure Rating: 150 psig (1034 kPa).

C. Combination fitting of copper alloy and ferrous materials.

D. Insulating materials suitable for natural gas.

E. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.7 SLEEVES

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.

2.8 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.

b. Calpico Inc.
c. Metraflex Company.
d. Pipeline Seal and Insulator, Inc.
e. Or approved equal.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe and sleeve.
3. Pressure Plates: Carbon steel.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one nut and bolt for each sealing element.

2.9 ESCUTCHEONS

A. General Requirements for Escutcheons: Manufactured wall and ceiling escutcheons and floor plates, with ID to fit around pipe or 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 or rough brass.

D. Split-Casting, Cast-Brass Escutcheons: With concealed hinge and set screw.

1. Finish: Polished chrome-plated or rough brass.

E. One-Piece, Stamped-Steel Escutcheons: With set screw or spring clips and chrome-plated finish.

F. Split-Plate, Stamped-Steel Escutcheons: With concealed hinge, set screw, and chrome-plated finish.

G. One-Piece, Floor-Plate Escutcheons: Cast-iron floor plate.

H. Split-Casting, Floor-Plate Escutcheons: Cast brass with concealed hinge and set screw.

2.10 PRESSURE GUAGES

A. 4½ in. diameter, black enamel coated steel case ring with shatterproof glass, ½ in. bronze bellows with brass socket, blow out on back of case, ¼ in. bottom outlet connection, similar to Trerice No. 860 or Weksler Instruments Corp. No. BL14-PWE4-LWXX or Nibco or approved equal with 0 to 27 in. of water column dial, brass pressure snubber and brass tee-handle cock.

B. Locate pressure gauges on inlet and outlet of gas booster pressure pump, at farthest point in system and as noted.

2.11 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored yellow.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. 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.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Locate valves for easy access.

H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections. Branches shall be taken off the riser with not less than two-elbow swing.

K. 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 “Firestops and Smokeseals.”

L. Verify final equipment locations for roughing-in.

M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.

1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches (75 mm) long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

Q. Connect branch piping from top or side of horizontal piping.

R. Install unions in pipes NPS 2 (DN 50) and smaller, adjacent to each valve, at final connection to each piece of equipment.

S. Do not use natural-gas piping as grounding electrode.

T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

U. Install pressure gage upstream and downstream from each line regulator.

3.3 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing or copper connector.

B. Install underground valves with valve boxes.

C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

D. Install earthquake valves aboveground outside buildings according to listing.

E. Install anode for metallic valves in underground PE piping.

3.4 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
5. 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.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

3.5 HANGER AND SUPPORT INSTALLATION

A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1 (DN 25) and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
3. NPS 1-1/2 and 2”: Maximum span, 108 inches ; minimum rod size, 3/8 inch.
4. NPS 2-1/2 and 3-1/2”: Maximum span, 120 inches; minimum rod size, 1/2 inch.
5. NPS 4”: Maximum span, 120 inches; minimum rod size, 5/8 inch.
6. Vertical piping at every floor.

B. Install seismic restraints on piping as required.

3.6 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install natural-gas piping electrically continuous and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70, 2008.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches (1800 mm) of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

3.7 LABELING AND IDENTIFYING

A. Comply with requirements in Division 22 Section 230553 "Identification for Plumbing Piping and Equipment" for piping and valve identification. Install detectable warning tape directly above gas piping, 12 inches (300 mm) below finished grade, except 6 inches below subgrade under pavements and slabs.

B. All piping shall be identified by a yellow label marked “Gas” in black letters. Labels shall be provided in accordance with ASME A13.1 and the marking shall be placed at intervals not exceeding 5 ft.

C. Piping from multiple meter installations shall be marked with an approved permanent identification by the installer so that the piping system supplied by each meter is readily identifiable.

3.8 FIELD QUALITY CONTROL

A. Test, inspect, and purge natural gas according to New York City Fuel Gas Code, 2014 Edition and Utility Company requirements.

B. Natural-gas piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.9 INDOOR PIPING SCHEDULE

A. Aboveground, branch piping NPS 1” and smaller shall be the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground, distribution piping shall be one of the following:

1. Steel pipe 4” and smaller with malleable-iron fittings and threaded joints.
2. Steel pipe 5” and larger with wrought-steel fittings and welded joints.

C. Provide hot-dipped galvanization for gas pipes exposed to the outdoor weather (on roofs).

3.10 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes NPS 2 and smaller at service meter shall be the following:
1. Bronze plug valve.

B. Distribution piping valves for pipe sizes NPS 2 and smaller shall be the following:
1. Bronze plug valve.

C. Valves in branch piping for single appliance shall be the following:
1. Bronze plug valve.

END OF SECTION 231123

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CONTRACT # 3

HVAC and FIRE PROTECTION WORK

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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. 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.

B. 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 facility'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 facility's maintenance personnel to adjust, operate, and maintain specific equipment.

6. Instruct the facility’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 contractors 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, gasketting 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 his 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 facility'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. Sprinkler Booster Pump
    c. Jockey Pump
    d. Smoke Purge Fan
    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 FACILITY’S 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 facility'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.

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. Public Areas: Light Hazard.
   e. 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. Base calculations on results of fire-hydrant flow test.

1. Engineering Services: 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: Subject to compliance with requirements, provide products by one of the following:

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: Subject to compliance with requirements, provide products by one of the following:

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. Or 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

1. Basis-of- Design Product: Subject to compliance with requirements, provide sprinkler drain and alarm test fittings of cast-iron or ductile-iron body, with threaded or locking inlet and outlet, test valve and orifice or sight glass, AFG Manufacturing Model 1000 or comparable product by one of the following:

a. Central Sprinkler Corp.
b. Fire-End and Croker Corp.
c. Viking Corp.
d. Victaulic Co. of America.
e. Or Approved Equal.

D. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Elkhart Brass Mfg. Co., Inc.
    b. Fire-End and Croker Corp.
    c. Potter-Roemer; Fire-Protection Div.
    d. Or Approved Equal.

E. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AGF Manufacturing Co.
    b. Central Sprinkler Corp.
    c. G/J Innovations, Inc.
    d. Triple R Specialty of Ajax, Inc.
    e. Or Approved Equal.

F. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. CECA, LLC.
    b. Merit.
    c. Central Sprinkler Corp.
    d. Or 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. Or 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. Or 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. Or 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. Or 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. Or 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. Or 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. Or 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. Or 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. Or 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. Or Approved Equal.

B. Siamese connection must be polished chrome plated. Lettering must be ”AUTO SPKR”.

C. Caps shall be painted green.

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 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.

3.5 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.

3.6 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.

3.7 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 ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

K. Install alarm devices in piping systems.

L. Hangers and Supports: Comply with NFPA 13-2007 for hanger materials and installation.

M. 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.

N. Fill wet-pipe sprinkler system piping with water.

3.8 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.

3.9 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

1. Rooms with open 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.

3.10 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 that 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.

3.11 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."

3.12 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in New York City Building Code, 2014 Edition.

B. Pipes and Valves must be painted in accordance with New York City Building Code, 2014 Edition.

3.13 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 FDNY 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 SPRINKLER BOOSTER 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 Sprinkler Booster 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 Aurora pump Model A-391-8 jockey pump, to operate at 3550 RPM with a capacity of 5 GPM at a 70 PSIG boost, or comparable product by one of the following:

1. Sta-Rite.
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: Subject to compliance with requirements, provide products by one of the following:

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.

5. Arrange for disposal of large quantities of water if fire-pump test water must be wasted.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to instruct facility's maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance pumps.

END OF SECTION 213113

SECTION 23 00 13 – HVAC 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 **$5,000.00** for the **HVAC 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 (cumingtonite-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 HVAC 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 HVAC 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 then 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"	l4”	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 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = 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 HVAC 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 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. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric Fittings
3. Escutcheons.
4. Equipment support base and rails
5. Equipment installation requirements common to equipment sections.
6. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct 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 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.

1.4 SUBMITTALS PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Welding Certificates.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details, piping and wiring diagrams.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “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 HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved by Commissioner 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.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to Section 23 23 00 “Refrigerant Piping” 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. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

B. Solvent Cements for Joining Plastic Piping:

1. CPVC Piping: ASTM F 493.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

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 150psig minimum working pressure at 180 deg F

2.4 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

2.5 EQUIPMENT SUPPORT BASE AND RAILS

A. Heavy gauge galvanized steel, unitized construction with integral base plate, fully insulated, continuous welded corner seams, pressure treated wood nailer, counter-flashing with screws. Internally reinforced to conform to plate load bearing factors.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Section 23 23 00 “Refrigerant Piping” specifying piping system.

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 by Commissioner 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 at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install escutcheons for penetrations of walls, ceilings, and floors.

L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire-stop materials.

M. Verify final equipment locations for roughing-in.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Section 23 23 00 “Refrigerant Piping” specifying piping system.

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. 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.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 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 HVAC equipment to facilitate service, maintenance, and repair or 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.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.

B. 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 HVAC 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.

END OF SECTION 23 05 00

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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 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 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.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for the following: include Product Data for components:

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

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.

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 must 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

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

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 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.

B. Shop Drawings: Show fabrication and installation details for the following: include Product Data for components:
   1. Equipment supports.

C. 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.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

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.

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 galva- nized or stainless steel. Pipe stand must 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 max- imum 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: Non-staining, noncorrosive, and nongaseous.
   2. Design Mix: 5000-psi, 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 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 fas- teners 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 equip- ment 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.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to 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.
      c. Heavy (MSS Type 33): 3000 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.

C. Use of powder actuated anchors must be confirmed with Commissioner.

END OF SECTION 23 05 29

SECTION 23 05 48.13 - VIBRATION 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. This Section includes the following:
   1. Isolation pads.
   2. Restrained spring isolators.
   3. Elastomeric hangers.
   4. Spring hangers.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: For each product indicated.

B. Engineering Services Submittal: 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 qualified professional engineer licensed in the State of New York responsible for their preparation.

C. Welding certificates

D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

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. 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 must 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%.

D. 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 REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 VIBRATION-CONTROL DEVICE INSTALLATION

A. Comply with requirements in Section 07 71 00 "Roof Specialties" 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. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the Commissioner if reinforcing steel or other embedded items are encountered during drilling. 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 Unit	Roof	Isolation Pad	Steel Structure.	Limit to 12% of pad thickness
Condensing Units	Roof	Isolation Pad	Steel Structure	Limit to 12% of pad thickness
Roof mount utility fans	Roof	Spring and Neoprene Isolators	Steel Structure	2-inch static deflection
Indoor AC units	Ceiling	Elastomeric hangers	Floor Framing Joists	Limit to 12.5% strain

END OF SECTION 23 05 48.13

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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. Duct labels.

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”.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

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. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Red.

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. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 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 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 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 20 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 air volume 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 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Strategies and Procedures Plan: Submit TAB strategies and step-by-step procedures as specified in Article 3.3.

B. Certified TAB reports.

1.6 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, NEBB or TABB.
   1. TAB Technician: Employee of the TAB subcontractor and who is certified by AABC, NEBB 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 subcontractor's forms approved by Commissioner.

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, 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 about HVAC system and equipment controls.

E. Examine ceiling plenums used for return air to verify that they meet the leakage class of connected ducts as specified in 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 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 operating safety interlocks and controls on HVAC equipment.

K. 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. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
6. 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" or “SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.

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 Section 23 07 00 "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 (IP) 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 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 for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit 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 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.

3.8 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 or minus 10 percent.

3.9 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.

3.10 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 sub-contractor.
   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. Contractor's name and address.
   6. Report date.
   7. Signature of TAB supervisor who certifies the report.
   8. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
   9. 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.
   10. Nomenclature sheets for each item of equipment.
   11. Data for terminal units, including manufacturer's name, type, size, and fittings.
   12. Notes to explain why certain final data in the body of reports vary from indicated values.
   13. 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. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:
   1. Quantities of outdoor, supply, return, and exhaust airflows.
   2. Duct, outlet, and inlet sizes.
   3. Terminal units.

3.11 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

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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. 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. Section 23 07 00 - HVAC Insulation.

B. Section 23 33 53 - Duct Liners.

C. Section 23 23 00 - Refrigerant Piping.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 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 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.

C. Field quality-control reports.

1.6 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. 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.

1.7 WARRANTY

A. Manufacturer must provide defective material warranty extending 12 months from substantial completion.

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 Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I with factory-applied ASJ 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.; Duct Wrap.
   b. Johns Manville; Microlite.
   c. Knauf Insulation; Duct Wrap.
   d. Owens Corning; All-Service Duct Wrap.

e. Or 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:
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. Mineral-Fiber Adhesive: Comply with Class 2, Grade A.
1. Products: Subject to compliance with requirements, provide one of 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).

C. ASJ Adhesive: Comply with Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. Products: Subject to compliance with requirements, provide one of 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).

2.4 MASTICS

A. Materials must be compatible with insulation materials, jackets, and substrates.

B. VOC limits.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. 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:

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.

D. 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:
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

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
1. 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; 95-44.
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.

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. Proto PVC Corporation; LoSmoke
      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. 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.
   5. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
   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.

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.

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 wide with 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) Ideal Tape Co.
         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) Ideal Tape Co.
4) Or 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 or 0.062-inch (1.6-mm) 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 (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. 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. Repair joint separations and cracking due to thermal movement.

O. Repair 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 (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. 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. Comply with requirements in Section 07 84 13 "Penetration Firestopping".

3.5 MINERAL-FIBER INSULATION INSTALLATION

A. 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.

3.6 FIELD-APPLIED JACKET INSTALLATION

A. 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.

3.7 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 Sections.
   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.

3.8 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 is limited to two location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
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 is limited to three locations of straight pipe, three locations of threaded fittings, two locations of threaded strainers, two locations of threaded valves, and two 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.

3.9 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:
1. Indoor, concealed or exposed supply and outdoor air.
2. Indoor, concealed or exposed return located in non-conditioned space.
3. Indoor, concealed or exposed exhaust between isolation damper and penetration of building exterior.
4. Outdoor, concealed or exposed supply and return.

B. Items Not Insulated:
1. Metal ducts with duct liner of sufficient thickness to comply with the 2014 NYC Energy Conservation Code.
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.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. All ductwork insulation performance (R value) and thickness must be in compliance with the 2014 NYC Energy Conservation Code.

B. Concealed, Supply-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.50-lb/cu. ft. nominal density.

C. Concealed, Return-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.50-lb/cu. ft. nominal density.

D. Concealed, Outdoor-Air Duct and Plenum Insulation: Mineral-fiber blanket 1-1/2 inches thick and 1.5-lb/cu. ft., nominal density.

E. Concealed, Exhaust-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

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.

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.

3.12 INDOOR PIPING INSULATION SCHEDULE

A. Refrigerant Piping:
   1. 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

3.13 OUTDOOR, 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. Provide watertight jacketing with weatherproofing.

C. Piping & Ductwork Exposed:
   1. Aluminum

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 facility’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 facility’s maintenance personnel to adjust, operate, and maintain specific equipment.

6. Instruct the facility’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 contractors 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, gasketting 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 facility'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. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of roof top units and VRF system. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

D. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air distribution systems; exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

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 following equipment and systems shall be evaluated:

1. Roof Top Units
2. AC Units 1-6, 7 & 8
3. ACCs 1 & 2
4. Toilet Exhaust Fans
5. Electric Unit Heaters
6. Associated Piping, Ductwork and Specialties
7. Associated BMS and Controls

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 FACILITY'S 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 facility'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 instruction on the control system in this facility. The intent is to clearly and

completely instruct the facility'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.

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SECTION 23 09 90 – INSTRUMENTATION AND 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 instrumentation and controls for HVAC systems.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Submit for approval shop drawings, bill of material, product data sheets, points list, sequence of operations, valve and damper schedules, program flow charts and all product samples required prior to the commencement of any field installation work. Indicate at the beginning of each submittal, all substitutions, and deviations from requirements of Contract Documents. Shop drawing submittals must be complete full-size drawings, 11" x 17" minimum, and include sufficient data to indicate complete compliance with Contract Documents.

1.5 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. Contractor 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. On-site emergency service must be available on a 24-hour, 7-day-a-week basis.

1.6 WORK DESCRIPTION

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. The Contractor must obtain services of an experienced Automatic Temperature Controls subcontractor (ATC) that is independent from the contractor who is regularly engaged in the installation and maintenance of ATC systems. The ATC subcontractor must provide all necessary information and required field supervision for a complete and operable automatic temperature control system.

C. The ATC subcontractor at the direction of the Contractor is responsible for a complete system of electronic automatic temperature controls. The ATC subcontractor must 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 electric/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. The ATC subcontractor at the direction of the Contractor must furnish all line voltage and low voltage wiring, conduit, panels, and accessories for a complete operational control system. The ATC subcontractor 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 the Contractor.

F. The Contractor must furnish all wells for water monitoring devices, flow switches, and alarms to be installed by the ATC subcontractor at the direction of the Contractor.

1.7 USER'S MANUALS

A. Submit two (2) draft copies of User's manual for review. After review by Commissioner, incorporate review comments and must submit four (4) interim final copies. Upon completion of project, acceptance of project by the Commissioner, submit six (6) copies of final "as built" manuals and one (1) reproducible copy (3-mil sepia Mylar). The User’s manual must include the same information that was furnished with the manuals turned over for the base building and must match the format.

1.8 WORK PERFORMANCE SCHEDULE

A. A time-phased schedule for delivery, installation, and acceptance of components for the complete system must be prepared. Submit this schedule to the Commissioner within five (5) days after award of contract. Submit updates and changes to this schedule promptly to the Commissioner.

1.9 WARRANTY

A. The manufacturer must guarantee the ATC system to be free from defects in material and workmanship for a period of one (1) year from substantial completion.

1.10 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 must be held during normal work hours of 8:00 a.m. to 4:30 p.m. weekdays. Provide 4 hours of instruction.

1.11 RECORD DRAWINGS

A. This ATC subcontractor at the direction of the Contractor must provide a complete set of "as-built" or record drawings. The drawings must be prepared and delivered to the Commissioner in an acceptable format and must indicate all work installed exactly in accordance with the original design.

PART 2 - PRODUCTS

2.1 MANUFACTURERS/INSTALLERS

A. Subject to compliance requirements provide products by one of the following:
   1. Honeywell
   2. Johnson Controls
   3. Allerton
   4. Or approved equal

2.2 AUTOMATIC CONTROLS

A. Furnish and install as herein specified, a complete automatic temperature control system of the direct digital control electronic type. All temperature controls under this subcontract are 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.

2.3 OPERATOR / NETWORK INTERFACE

A. The system must have controller as a front-end controller/sever. This controller will handle all alarming, trending, scheduling, network management, internet access and graphics.

B. 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 are not acceptable.

C. 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 Management System (BMS), are not acceptable.

D. The Web browser client must support at a minimum, the following functions: User log-on identification and password must be required. If unauthorized user attempts access, notice of access failure must be displayed. Security using authentication and encryption techniques to prevent unauthorized access must be implemented. 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. 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. Real-time values displayed on a Web page must update automatically without requiring a manual "refresh" of the Web page. Users must have administrator-defined access privileges. 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.

E. Alarms: 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: Allow configuration to generate alarms on any numeric, binary, or data point in the system, Generate alarm records that contain a minimum of a timestamp, original state, acknowledged state, alarm class and priority, Allow the establishment of alarm classes that provide the routing of alarms with similar characteristics to common recipients, Allow a user, with the appropriate security level, to manage alarms - including sorting, acknowledging, and tagging alarms and Reports and Summaries

F. Schedules: 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: Regular schedules, Repeating schedules and Exception Schedules. Weekly schedules must be provided for each group of equipment with a specific time use schedule. It must be possible to define one or more exception schedules for each schedule including references to calendars. 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.

G. Password: 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. Each user must have the following: a user name, a password, and access levels. The system must provide the capability to require a password of minimum length and require a combination of characters and numerical or special characters. When entering or editing passwords, the system must not echo the actual characters for display on the monitor. 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. A minimum of 100 unique passwords must be supported. 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. The system must automatically generate a report of log-on/log-off and system activity for each user. All log data must be available in .pdf, .txt, and .csv formats.

H. Dynamic Color Graphics: The graphics application program must be supplied as an integral part of the User Interface. 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. The graphics must be able to display real-time data that is acquired, derived, or entered. Graphics runtime functions –Each graphic application must be capable of the following functions, All graphics must be fully scalable, The graphics must support a maintained aspect ratio, Multiple fonts must be supported and Unique background must be assignable on a per graphic basis. It must be possible to change values (setpoints) and states in systems controlled equipment within the Web browser interface. 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.

I. Historical Data Collection: 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. The configuration of the historical data collection must allow for recording data based on change of value or on a user-defined time interval. The configuration of the historical data collection must allow for the collection process to stop or rollover when capacity has been reached. 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. The history data table view must allow the user to hide/show columns and to filter data based on time and date. The history data table must allow exporting to .txt, .csv, or .pdf file formats. The historical data chart view must allow different point histories to be displayed simultaneously, and also provide panning and zooming capabilities.

J. Audit Log: For each log entry, provide the following data; Time and date, User ID, Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

K. Database Backup and Storage: The user must have the ability to backup the System Controller databases.

2.4 APPLICATION CONTROLLER

A. The controllers must be BACnet MS/TP network devices designed to control HVAC equipment. The controllers must provide many options and advanced system features programmable and configurable that allow state-of-the-art commercial building control.

B. Each controller contains a host microcontroller to run the main HVAC application and a second microcontroller for BACnet MS/TP network communications. Each controller provides flexible, universal inputs for external sensors, digital inputs, and a combination of analog outputs and digital outputs.

C. Features

1. Uses BACnet MS/TP network communication.
2. EIA-485 communications network. Capable of baud rates between 9.6 and 115.2 kbits/s.
3. Capable of stand-alone operation, but can also use BACnet MS/TP network communications.
4. Support for up to 40 controllers per BACnet MS/TP segment (under 30 is recommended).

5. Field configurable and programmable for control, input, and output functions using the niagara framework software.
6. Function Block engine, which allows the application designer to program the controller to perform a wide variety of HVAC applications.
7. Built-in Zone Control functions include a remote wall module interface and a scheduler.
8. Unitary equipment control. Unitary equipment may perform one or all of the functions of HVAC—ventilation, filtration, heating, cooling, humidification and distribution.
9. All wiring connections are made to removable terminal blocks to simplify controller installation and replacement.
10. Both controller housing and actuator are UL plenum rated.

D. Specifications
1. Rated Voltage: 20-30 Vac; 50/60 Hz
2. Power Consumption: 100 VA for controller and all connected loads
3. Controller only Load: 5 VA maximum
4. External Sensors Power Output: 20 Vdc ±10% @ 75 mA maximum
5. Environmental:
6. Temperature: Minimum -40° F (-40° C); Maximum 150° F (65.5° C)
7. Relative Humidity: 5% to 95% non-condensing
8. Operating Range
9. Operating Range: 24 hour, 365 day, multi-year calendar including day of week and configuration for automatic daylight savings time adjustment to occur at 2:00 a.m. local time on configured start and stop dates
10. Power Failure Backup: 24 hours at 32°F to 100°F (0°C to 38°C), 22 hours at 100°F to 122°F (38°C to 50°C)
11. Accuracy: ±1 minute per month at 77° F (25° C)

2.5 CABLING

A. Cabling should be selected that meets or exceeds the BACnet Standard which specifies the following: an MS/TP EIA-485 network must use shielded, twisted-pair cable with characteristic impedance between 100 and 130 ohms. Distributed capacitance between conductors must be less than 100 pF per meter (30 pF per foot). Distributed capacitance between conductors and shield must be less that 200 pF per meter (60 pF per foot). Foil or braided shields are acceptable. The Honeywell tested and recommended MS/TP cable is 18 AWG, 1-Pair, Shielded, Low Cap, Plenum cable), that meets the BACnet Standard requirements.

B. Building Controllers: The BACnet MS/TP network is polarity sensitive. The maximum BACnet MS/TP network Bus segment length is 4,000 ft. (1,219 m) using recommended wire. Repeaters must be used when making runs longer than 4,000 ft. (1,219 m). A maximum of three repeaters can be used between any two devices.

2.6 FIELD DEVICES

A. General

1. All devices and equipment must be approved for installation.

B. Analog Sensors

1. All temperature sensors must use thermistors with sensor accuracy of +/- .5 ºf. Provide Minco, Thermik, Locon Sensor Systems, Inc or approved equal. The space sensor must have a local display for space temperature and set point and a provision for adjusting the space set point. The sensor must be submitted for approval by Commissioner.
2. Humidity sensors must be capacitive type with an accuracy of 2%. Provide Hycal, Kinequip, Inc, M & M Control or approved equal.
3. Static pressure transmitter must be Setra c-c-264, IFM Efector, M & M control or approved equal.

C. Wall Sensor:

1. Wall sensor must include temperature, humidity and CO2 sensor with MS/TP capability provide users with control interface, test and balance tool and filed service tool.
2. The strengthened glass touchscreen user interface must have capability to display the setpoint, room, and outside air temperature, relative humidity and CO2 level.
3. The thermistors are integrated with the device. The thermistors and humidity sensors must be processed by an onboard microcontroller.
   a. Thermistors.
      1) Type: NTC
      2) Resistance - 100K Ohm at 77 °F (25 °C).
      3) Time Constant* - 20 minutes (to 63% of new temperature).
      4) Stability* - Maximum 0.036 °F (0.02 °C) drift per year.
      5) Accuracy* - ± 0.36 °F over range of 32 to 116 °F (0 to 47 °C); ± 0.19 °F at 72 °F (22 °C).
      6) Power - 24 VAC.

   b. CO2 Sensor.
      1) Operating Temperature Range - 32 to 122 °F (0 to 50 °C).
      2) Power Consumption - 1.5 mA for measurement every 30s; 0.74 mA for measurement every 60s; 86 µA for measurement every 15 min; 52 µA for measurement every 60 min.
      3) Measurement Range - 0 to 5000 ppm.
      4) Accuracy - ± 30 ppm, ± 3% of reading.
   c. Humidity Sensor.
      1) Operating Temperature Range - 50 to 113 °F (10 to 45 °C).
      2) Repeatability - Minimum ± 0.5% RH.
      3) Accuracy - ± 3% at 10 to 90% RH, ± 5% at 0 to 10% and 90% to 100%RH.

4) Communications - Microset bus up to 115.2 Kbps.
5) Ratings - UL Standard for Safety 916; EMC Directive 89/336/EEC (European CE Mark)FCC Part 15.107 & 109, Class B, CFR47-15.

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. 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.
8. All relays, electrical wiring, panels, outputs, etc. to make a complete operational system, must be provided and installed as part of this section. See sequences of operation in Part 4 for details.

B. Design Criteria

1. The Automatic Temperature Control (ATC) must be programmed to start and stop the Rooftop Unit based on occupancy schedules as coordinated with the Commissioner. The ATC must also provide equipment interlocks as required.
2. Fire Alarm Interface for Fans
a. The Fire Alarm System must provide outputs to notify the ATC of fire alarms.
b. All fan systems must be stopped from the FAS. When the fan system stops, all associated dampers must close.

c. All return and exhaust fans must be stopped from the FAS. When the fan stops, all associated dampers must close.

d. Smoke purge fan EF-1 must be energized upon activation from the fire fighters control panel.

3.3 ELECTRICAL INSTALLATION WIRING AND MATERIALS

A. The ATC subcontractor at the direction of the Contractor is responsible for all electrical control work associated with the ATC, HVAC and plumbing systems, which is not specified as work of other trades.

1. Perform all wiring in accordance with the 2014 NYC Electrical Code.
2. Install all line voltage wiring, concealed or exposed, in conduit in accordance with the Division 26 specifications, NEC and the 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 embodiment 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 TESTING AND ACCEPTANCE

A. Acceptance Testing

1. Submit for approval, a detailed acceptance test procedure designed to demonstrate compliance with contractual requirements.

2. Demonstrate system performance to Commissioner for final system acceptance.

PART 4 - SEQUENCES OF OPERATION

4.1 GENERAL

A. Provide a complete and operational temperature control and building automation system based on the following points and sequence of operation. The system must be complete as to sequences and standard control practices. The determined point list is the minimum amount of points that are to be provided. If additional points are required to meet the sequence of operation, they will be provided.

B. BACnet Object List

1. The following points as defined for each piece of equipment are designated as follows:
   a. Binary Out (BO) - Defined as any two-state output (start/stop) (enable/disable), etc.
   b. Binary In (BI) - Defined as any two-state input (alarm, status), etc.
   c. Analog In (AI) - Defined as any variable input (temperature) (position), etc.
   d. Analog Out (AO) - Defined as any electrical variable output. 0–20mA, 4–20mA and 0–10VDC are the only acceptable analog outputs. The driver for analog outputs must come from both hardware and software resident in the controllers. Transducers will not be acceptable under any circumstance

C. All set points referenced in this section are subject to change and must be adjustable from the BMS Operator Workstation and from a Portable Operators Terminal.

4.2 ROOFTOP UNIT (RTU-1,2,3)

A. General
1. The rooftop unit is provided with factory installed controls. The safety controls, operating modes and sequence of operation are summarized below for commissioning reference.

B. Safety Controls
1. Provide low-limit controller to prevent mixed air from falling below 45°F.
2. A hard-wired interlocked supply high discharge switch must stop the supply fan when duct pressure exceeds design value. The fan must remain off until the pressure switches are reset. An alarm condition will be sent to the BMS.
3. All duct mounted automatic control instruments must be mounted on the exterior surface of the insulation, on suitable metal saddles. Provide appropriate extension mountings for control devices to clear insulation.
4. Provide remote restart of unit from switch in fire alarm panel upon life-safety shutdown.

C. Operating Modes:

1. The operating modes of the RTU must be automatically determined by the combined input of the building schedule, controls and safety devices.
2. Summer/Winter Mode and Economizer: Mode Selection:

   a. The Rooftop unit must be automatically indexed to operate in either the cooling and/or dehumidification mode or heating mode based on the space temperature and humidity and space setpoint temperature.

   b. When in cooling mode, if the outside temperature is greater than or equal to 55 F but less than 65F, the unit may not be in the Economizer Mode depending on the enthalpy of the outside air as compared to the enthalpy of the return air. The Mode must be determined by comparison of the controller's calculated return air enthalpy to the calculated global outside air enthalpy. When the outside air enthalpy is less than the return enthalpy the air handling unit must be indexed to the Economizer Mode. When the outside air enthalpy is greater than the return enthalpy, the air handling unit must be indexed to Summer Mechanical Cooling Mode with modulating hot gas reheat activated to maintain space temperature and humidity.

   c. Upon a BMS Network communication failure, the air handling unit must default to the seasonal Occupied Mode.

   d. Gas Furnace: Unit to energize modulating, indirect gas furnace to maintain space setpoint temperature.

D. Sequence of Operation:

1. Safety Control Operation:
   a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire alarm control panel.
   b. Fire Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence described in Section 28 46 00“Fire Detection and Alarm”.
   c. Coordinate wiring with other trades for remote manual start of unit from switch in fire alarm control panel.

2. Unit controls shall sequence heating, economizer, cooling and dehumidification and reheat in sequence to meet space setpoint temperature and humidity conditions.
3. Unoccupied Cycle: When the RTU is in unoccupied mode, the outside air dampers must be closed, the fans must be OFF until such time that the space temperature either rises above or falling below the night setup temperature set-point (NSU).
   a. Unoccupied Cooling
      1) The RTU is cycled to maintain the unoccupied space night set-up (NSU) of 85°F (adj.). On a rise in space temperature above the NSU the fans are energized, the cooling compressors are cycled ON.
      2) On a drop in space temperature below the NSU by a differential of 5°F the cooling compressors are cycled OFF and the fans are de-energized.
      3) When the unit is in unoccupied cooling the outside air damper is closed.

4) Override Operation:2 hours

b. Unoccupied Heating

1) The RTU is cycled to maintain the unoccupied space night set-up (NSU) of 65°F (adj.). On a fall in space temperature below the NSU the fans are energized, the heating is cycled ON.
2) On a rise in space temperature above the NSU by a differential of 5°F the heating is cycled OFF and the fans are de-energized.
3) When the unit is in unoccupied heating the outside air damper is closed.
4) Override Operation: 2 hrs

c. Morning Startup

1) The unit must use an optimal start algorithm for morning start-up. This algorithm must minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.

d. Occupied Cycles:

1) The supply fan is commanded ON to run continuously subject to all safeties and unit will go to morning warmup mode.
2) The outside air damper to remain in closed position.
3) The unit will start and operate in cooling or heating mode based on space air temperature to reach a design set-point in the space.
4) When the design setpoint point in the space is reached the outside air damper will opened to its minimum ventilation position.

e. Supply Fan Control: Unit supply fan must be configured as single zone VAV controlled as variable volume variable temperature (VVVT) as follows.

1) Cooling mode:
   a) With fall in space temperature supply air shall modulate down to 60 % (adjustable) of design air flow at constant supply temperature to meet room setpoint
   b) Once the 60% design flow is reached, unit shall run as constant volume system with supply air temperature reset to meet space setpoint condition.
   c) On rise in space temperature the sequence shall reverse.
2) Heating mode:
   a) With rise in space temperature supply air shall modulate down to 60 % (adjustable) of design air flow at constant supply temperature to meet room setpoint
   b) Once the 60% design flow is reached, unit shall run as constant volume system with supply air temperature reset to meet space setpoint condition.
   c) On fall in space temperature the sequence shall reverse.

f. Occupied Heating

1) The unit to be scheduled in occupied heating mode based on space air temperature and schedule.
2) The unit will modulate gas fired furnace to maintain space setpoint temperature of 70 deg F.

3) When the temperature in the space will rise above 72°F (adj.) the heat to modulate down. If the temperature in the space will keep rising above 74°F (adj.) the heat will turn off.
4) If the temperature in the space will fall below 68°F (adj.) the furnace will be energized.
5) Supply fan is on to always circulate air when the unit is in occupied heating mode.
6) Upon loss of communication with the BMS network, the direct digital controller must revert to a default schedule internal to the controller, automatically resuming normal schedule operation once communication is resumed.

g. Occupied Cooling / Dehumidification and Reheat

1) The unit to be scheduled in occupied cooling mode based on space air temperature and schedule.
2) If the space air temperature is greater than or equal to setpoint, the unit must be indexed to the Mechanical Cooling Mode. Mechanical DX cooling must be controlled in stages and sequenced to maintain a constant space temperature condition with space cooling setpoint of 74°F (adj.) with 2-F (adj.) differential.
3) It the space humidity is greater than setpoint of 50%±5% RH and rise above 55%±5%RH unit de-humidification cycle shall be activated with cooling and modulating hot has bypass reheat to maintain space temperature and humidity setpoints.
4) Supply fan is on to circulate always when the unit is in occupied cooling mode.
5) Upon loss of communication with the BMS network, the direct digital controller must revert to a default schedule internal to the controller, automatically resuming normal schedule operation once communication is resumed.

h. Demand Control Ventilation:

1) Field installed CO_2 sensor mounted in space shall modulate outdoor air damper to maintain set-point condition of 800 ppm (adj) during occupied periods.

E. BMS Points

1. Provide for following BMS I/O points

a. Inputs:

1) Fire alarm system status
2) Supply air fan status
3) Number of cooling stages
4) Discharge air temperature
5) Outside air temperature
6) Outside air humidity
7) Return air temperature
8) Return air humidity
9) Space temperature
10) Filter status
11) Compressor status
12) Outside air damper position
13) Exhaust air damper
14) Compressor lock out temperature
15) Gas furnace status

16) Energy Recovery Wheel Status
17) Heating lock out temperature
18) Space CO2 level

b. Outputs:

1) Occupied cooling setpoint temperature
2) Unoccupied cooling setpoint temperature
3) Occupied humidity setpoint
4) Occupied heating setpoint temperature
5) Unoccupied heating setpoint temperature
6) Economizer control setpoint
7) Time of day schedule
8) Outside air damper position
9) Compressor lock out temp
10) Heating lock out temp

4.3 DEDICATED OUTDOOR AIR UNIT (RTU-4)

A. General

1. The rooftop unit is provided with factory installed controls. The safety controls, operating modes and sequence of operation are summarized below for commissioning reference.

B. Safety Controls

1. Provide low-limit controller to prevent mixed air from falling below 45°F.
2. A hard-wired interlocked supply high discharge switch must stop the supply fan when duct pressure exceeds design value. The fan must remain off until the pressure switches are reset. An alarm condition will be sent to the BMS.
3. All duct mounted automatic control instruments must be mounted on the exterior surface of the insulation, on suitable metal saddles. Provide appropriate extension mountings for control devices to clear insulation.
4. Provide remote restart of unit from switch in fire alarm panel upon life-safety shutdown.

C. Refer to Section 23 74 33 “Dedicated Outdoor Air Unit” for the factory furnished controls and associated sequences. The factory furnished controls must be provided with BACnet MS/TP communication. The BMS contractor must provide all required field wiring of controls that cannot be factory installed for proper AC unit operation. The BMS contractor must connect the Direct Digital Controller to the NAC network for point monitoring and control from the operator interface.

D. Operating Modes:

1. The operating modes of the RTU must be automatically determined by the combined input of the building schedule, controls and safety devices.
2. Summer/Winter Mode and Economizer: Mode Selection:

a. The Rooftop unit must be automatically indexed to operate in either the cooling and/or dehumidification mode or heating mode based on space temperature and humidity and space setpoint temperature.

b. When in cooling mode, if the outside temperature is greater than or equal to 55 F but less than 65F, the unit may not be in the Economizer Mode depending on the dewpoint of the outside air as compared maintain space humidity (dewpoint) setpoint. The Mode must be determined by comparison of the controller's calculated space relative humidity to the outside air dewpoint. When the outside air dewpoint is less than the space dewpoint the air handling unit must be indexed to the Economizer Mode. When the outside air dewpoint is greater than the space dewpoint, the air handling unit must be indexed to Summer Mechanical Cooling Mode with modulating hot gas reheat activated to maintain space temperature and humidity.

c. Upon a BMS Network communication failure, the air handling unit must default to the seasonal Occupied Mode.

d. Provide position indicator on outdoor air damper.

e. Gas Furnace: Unit to energize modulating gas furnace to maintain space setpoint air temperature as indicated in Sequence of Operation.

E. Sequence of Operation:

1. Safety Control Operation:
   a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire alarm control panel.
   b. Fire Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence described in Section 28 46 00 “Fire Detection and Alarm”
   c. Coordinate wiring with other trades for remote manual start of unit from switch in fire alarm control panel.
2. Unoccupied Cycle: When the RTU is in unoccupied mode, the outside air dampers must be closed, the fans must be OFF until such time that the space temperature either rises above or falling below the night setup temperature set-point (NSU).
   a. Unoccupied Cooling
      1) The RTU is cycled to maintain the unoccupied space night set-up (NSU) of 85°F (adj.). On a rise in space temperature above the NSU the fans are energized, the cooling compressors are cycled ON.
      2) On a drop in space temperature below the NSU by a differential of 5°F the cooling compressors are cycled OFF and the fans are de-energized.
      3) When the unit is in unoccupied cooling the outside air damper is closed.
      4) Override Operation:2 hours
   b. Unoccupied Heating
      1) The RTU is cycled to maintain the unoccupied space night set-up (NSU) of 65°F (adj.). On a fall in space temperature below the NSU the fans are energized, the heating is cycled ON.
      2) On a rise in space temperature above the NSU by a differential of 5°F the heating is cycled OFF and the fans are de-energized.
      3) When the unit is in unoccupied heating the outside air damper is closed.

4) Override Operation: 2 hours

c. Morning Startup

1) The unit must use an optimal start algorithm for morning start-up. This algorithm must minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.

d. Occupied Cycles:

1) The supply fan is commanded ON to run continuously subject to all safeties and unit will go to morning warmup mode.
2) The outside air damper to remain in closed position.
3) The unit will start and operate in cooling or heating mode based on space air temperature to reach a design set-point in the space.
4) When the design setpoint point in the space is reached the outside air damper will opened to its minimum ventilation position.

e. Occupied Heating

1) The unit to be scheduled in occupied heating mode based on space air temperature and schedule.
2) The unit will modulate modulating gas furnace to maintain space setpoint temperature of 70 deg F.
3) When the temperature in the space will rise above 72°F (adj.) the heat to modulate down. If the temperature in the space will keep rising above 74°F (adj.) the heat will turn off.
4) If the temperature in the space will fall below 68°F (adj.) the furnace will be energized.
5) Supply fan is on to always circulate air when the unit is in occupied heating mode.
6) Upon loss of communication with the BMS network, the direct digital controller must revert to a default schedule internal to the controller, automatically resuming normal schedule operation once communication is resumed.

f. Occupied Cooling / Dehumidification and Reheat

1) The unit to be scheduled in occupied cooling mode based on space air temperature and schedule.
2) If the space air temperature is greater than or equal to setpoint, the unit must be indexed to the Mechanical Cooling Mode. Mechanical DX cooling must be controlled in stages and sequenced to maintain a constant space temperature condition with space cooling setpoint of 75°F (adj.) with 2-F (adj.) differential.
3) It the space humidity is greater than setpoint of 50%±5% RH and rise above 55%±5%RH unit de-humidification cycle shall be activated with cooling and modulating hot has bypass reheat to maintain space temperature and humidity setpoints.
4) Supply fan is on to circulate always when the unit is in occupied cooling mode.
5) Upon loss of communication with the BMS network, the direct digital controller must revert to a default schedule internal to the controller, automatically resuming normal schedule operation once communication is resumed.

F. BMS Points

1. Provide for following BMS I/O points

a. Inputs:

1) Fire alarm system status
2) Supply air fan status
3) Number of cooling stages
4) Discharge air temperature
5) Outside air temperature
6) Outside air humidity
7) Space temperature
8) Prefilter Status
9) Filter status
10) Compressor status
11) Outside air damper position
12) Compressor lock out temperature
13) Gas Furnace status
14) Heating lock out temperature

b. Outputs:

1) Occupied cooling setpoint temperature
2) Occupied humidity setpoint
3) Occupied heating setpoint temperature
4) Economizer control setpoint
5) Time of day schedule
6) Outside air damper position
7) Compressor lock out temp
8) Heating lock out temp

4.4 VRV HEAT SYSTEM

A. Refer to Section 238129 “Variable Refrigerant Flow HVAC Systems” for the factory furnished control and associated sequences. The ATC subcontractor must provide all required field wiring of controls that cannot be factory installed for proper AC unit operation. The ATC subcontractor must connect the direct digital controller to the NAC network via the VRV system BACnet gateway and programmed for point monitoring and control from the central BMS system.

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 Unit)

1. Start/Stop Status
2. Start/Stop Operation
3. Cooling/Heating Mode Setting
4. Room Temperature Setpoint
5. Airflow Rate Setting

6. Airflow Direction Setting
7. Alarm
8. Malfunction Code
9. Air-Conditioning Mode
10. Room Temperature
11. Filter Status
12. Compressor Status
13. Indoor Fan Status

4.5 EXHUAST FAN – ON/OFF (TX-1, TX-2)

A. The fan must run according to a user definable schedule. The fan must have a user definable minimum runtime. All scheduling and control must be through the BMS interface.

B. The exhaust air motorized damper must open anytime the unit runs and must close anytime the unit stops. The fan must be enabled after the damper status has proven.

C. The BMS must monitor the fan status

D. Direct Digital Control Points:
   1. Fan Start/Stop
   2. Fan Status
   3. Damper Status
   4. Schedule
   5. Fan Failure
   6. Damper Failure

4.6 ELECTRIC HEATERS (EH-1 A, B, C, D) (EH-2 A, B, C, D)

A. The thermostat must measure the zone temperature and cycle on/off the heat to maintain its setpoint.

B. The BMS must control the heater operation and monitor the heater status

C. Direct Digital Control Points:
   1. Zone temperature set point
   2. Zone temperature
   3. High/low zone temp
   4. High/low discharge air temperature
   5. Heater status

6. Heater failure

4.7 AV/IT CLOSET (ROOM 200A, 202)

A. Provide room temperature sensor

B. Direct Digital Control Points:
   1. Room high temperature alarm

4.8 ELEVATOR MACHINE ROOM

A. Provide room temperature sensor

B. Direct Digital Control Points:
   1. Room high temperature alarm
   2. Room low temperature alarm

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SECTION 232113 - HYDRONIC 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 pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
   1. Condensate-drain piping.

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 the following:

   1. Copper piping and fittings
   2. Plastic pipe and fittings with solvent cement.
   3. Pressure-seal fittings.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

1.6 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation must be capable of withstanding the following minimum working pressure and temperature:
   1. Condensate-Drain Piping: 150 deg F

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L

B. Wrought-Copper Fittings: ASME B16.22.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Anvil International, Inc.
    b. S. P. Fittings; a division of Star Pipe Products.
    c. Victaulic Company of America.
    d. Or Approved Equal

2. Grooved-End Copper Fittings: ASTM B 75, copper tube or ASTM B 584, bronze casting.

C. Wrought-Copper Unions: ASME B16.22.

2.2 PLASTIC PIPE AND FITTINGS

A. CPVC Plastic Pipe: ASTM F 441/F 441M, Schedules 40 and 80, plain ends as indicated in Part 3 "Piping Applications" Article.

B. CPVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM F 438 for Schedule 40 pipe; ASTM F 439 for Schedule 80 pipe.

2.3 JOINING MATERIALS

A. Solvent Cements for Joining Plastic Piping:

1. CPVC Piping: ASTM F 493.

    a. Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    b. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

B. Gasket Material: Thickness, material, and type suitable for fluid to be handled and working temperatures and pressures.

2.4 TRANSITION FITTINGS

A. Plastic-to-Metal Transition Fittings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Charlotte Pipe and Foundry Company.
    b. IPEX Inc.
    c. KBi.
    d. Or Approved Equal

2. CPVC one-piece fitting with one threaded brass or copper insert and one Schedule 80 solvent-cement-joint end.

2.5 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 and Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Capitol Manufacturing Company.
b. Central Plastics Company.
c. Hart Industries International, Inc.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
e. Zurn Plumbing Products Group; AquaSpec Commercial Products Division.
f. Or Approved Equal

2. Factory-fabricated union assembly, for 250-psig minimum working pressure at 180 deg F.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 PIPING APPLICATIONS

A. Condensate-Drain Piping: Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints or Schedule 40 CPVC plastic pipe and fittings and solvent-welded joints.

B. Condensate-Drain Piping: Schedule 40 CPVC plastic pipe and fittings and solvent-welded joints.

3.3 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such 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.

B. Install piping in concealed locations, 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 specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install piping to allow application of insulation.

H. Select system components with pressure rating equal to or greater than system operating pressure.

I. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

J. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

K. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

3.4 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Comply with the following requirements for maximum spacing of supports.

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
2. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.

C. Install hangers for drawn-temper copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 3/4: Maximum span, 5 feet ; minimum rod size, 3/8 inch.
2. NPS 1: Maximum span, 6 feet ; minimum rod size, 3/8 inch.
3. NPS 1-1/4: Maximum span, 7 feet ; minimum rod size, 3/8 inch.
4. NPS 1-1/2: Maximum span, 8 feet ; minimum rod size, 3/8 inch.

D. Plastic Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.

E. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.

3.5 PIPE JOINT CONSTRUCTION

A. 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.

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

B. Plastic Piping Solvent-Cemented 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.

C. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.

D. Mechanically Formed, Copper-Tube-Outlet Joints: Use manufacturer-recommended tool and procedure, and brazed joints.

3.6 TERMINAL EQUIPMENT CONNECTIONS

A. Sizes for equipment connections must be the same as or larger than equipment connections.

3.7 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure.
4. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

END OF SECTION 23 21 13

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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. Refrigerant piping and fittings.
   2. Refrigerant.
   3. Refrigerant piping insulation.
   4. Line set covers
   5. Roof penetration housings

1.3 RELATED SECTIONS

A. Section 230700 “HVAC Insulation”.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 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.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

D. Materials must conform to the latest edition of reference specifications and industry standards specified herein and applicable, and to,
   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.

E. Manufacturer's Qualifications: Firms regularly engaged in manufacture of pipes and pipe fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

1.7 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.

1.8 WARRANTY

A. Manufacturer must provide warranty against defective material extending 12 months from substantial completion.

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. Manufacturers:
1. DuPont,
2. Honeywell,
3. Mexichem
4. Or approved equal.

B. Refrigerant: R-410 A

2.3 INSULATION

A. Manufacturers: Subject to compliance with requirements provide products by one the following:
1. AP Armaflex,
2. Firwin Corp,
3. AC Accoflex
4. Or approved equal

B. Insulation must be a flexible, closed-cell elastomeric ASTM C534 Grade 1, Type I pipe insulation. Adhesive must be contact adhesive recommended by insulation manufacturer.

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 2010.

2.4 LINE SET COVER

A. The line-set cover must comprise of 20-gauge, roll-formed rectangular sheet metal line-set duct and fittings. It must features, anti-corrosive, scratch-resistant hot-dipped and chromium-free ZAM coating (Zinc, Aluminum and Magnesium) that provides a superior, more durable and lighter weight alternative to galvanized steel.

B. The line set covers must be designed to be used vertically or horizontally to protect line-sets associated with any air conditioning, refrigeration or industrial cooling process equipment.

C. Widths of 12-, 18-, 24- and 36-in. respectively must all be 5-1/8-in. high. Based on a 3/8 x 3/4-in. line-set with 1/2-in. insulation on both lines, the line-set ducting must accommodate the following number of line-sets:
1. 12 inch width (8),

2. 18 inch width (12)
3. 24 inch width (19)
4. 36 inch width (25)

D. On rooftop systems when the top of the line-set duct is used as walkways, a reinforced heavier gauge cover plate with a non-skid surface must be available as a special-order option.

E. The line-set system manufacturer to provide minimum 1-year warranty from date of substantial completion.

2.5 ROOF PENETRATION HOUSING

A. Manufacturer: Subject to compliance with requirements provide products by one the following:
1. Roof Penetration Housing LLC
2. Alta Products, LLC.
3. SBC Industries
4. Or approved equal.

B. Four-piece powder coated heavy gauge aluminum assembly (vandal resistant lid, pre-insulated housing (R4.3 @ 75F), insulation extension and curb), stainless steel screws.

C. Designed to meet the IECC 2015/2018 code for roof insulation integrity.

D. Compliance
1. Third party tested for compliance to FEMA 320/361 & ICC 500-2014 for 225mph hurricane winds.
2. Third party tested to meet 2015 IECC C402.5 & ASTM E2178-13 for air permeance/air leakage.
3. Manufactured in USA ISO 9001 facility.
4. Solar Reflection Index of 88.2.

E. Exit Seals: Weather-tight Exit Seals & ductwork adapters
1. Threaded connection or flange connection easily & quickly attaches to vault
2. Weather tight and UV resistant – 1 year warranty from date of substantial completion
3. Silx14 gaskets rated for -25°F to +475°F.

2.6 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 shall be heavy bodied, easy brush application suitable for application above 50 deg F , non-flammable with VOC content less than 10 grams/liter

C. Manufacturers:
1. Armacell.
2. Aeroflex USA.
3. K-Flex.
4. Or approved equal.

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.

B. AC Condensate: Copper Type K or L, ASTM B88.

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 according to ASHRAE 15.

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 if valves or equipment requiring maintenance is concealed behind finished surfaces.

L. Install refrigerant piping in protective PVC 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 Section 07 84 13 "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 Section 07 92 00 "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. Manufacturer: Subject to compliance with requirements, provide contact adhesive by one of the following:
   1) Armacell
   2) K-Flex
   3) 3M
   4) Or approved equal
c. To minimize the movement of insulation hangers 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.
d. 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.
e. 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.
f. All insulation exposed to sunlight or installed outdoors must be protected with two coats of weather and UV resistant coating.

3.6 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Section 23 05 29 "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 TESTING AND SYSTEM CHARGING

A. Refrigerant System Piping Test and Purging
   1. Piping must be tested in three steps with nitrogen to test pressure as follows:
      a. Step-1: Leak check after 3 minutes @ 150 psig
      b. Step-2: Leak check after 5 minutes @ 300 psig
      c. Step-1: Leak check after 24 hours @ 550 psig

   2. System evacuation must be carried out in three steps as follows

      a. Evacuate system to 4000 microns and hold for 20 minutes. Break vacuum 2ith 2-3 psig dry nitrogen and hold for 15 minutes
      b. Evacuate system to 1500 microns and hold for 20 minutes. Break vacuum 2ith 2-3 psig dry nitrogen and hold for 15 minutes
      c. Evacuate system to 500 microns and hold for 60 minutes.
   3. If vacuum holds for 12 hours at ambient temperatures of 60ºF, system is ready for charging.

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 New York City Fire Code.

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:
   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.

3.10 REPORTING

A. Contractor must prepare a Certificate of Test in accordance with New York City Mechanical Code, Section 1108.4

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 ducts and fittings.
   3. Sheet metal materials.
   4. Duct liner.
   5. Sealants and gaskets.
   6. Hangers and supports.

1.3 RELATED SECTIONS:

A. Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC".

B. Section 23 33 00 "Air Duct Accessories".

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. 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.

C. 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.

D. Engineering Services Submittal:
1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

E. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each trade, 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. Access panels.
   e. Perimeter moldings.

F. Welding certificates.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2007, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up"

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2013, Section 6.4.4 - "HVAC System Construction and Insulation"

PART 2 - PRODUCTS

2.1 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.

2.2 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."

2.3 ROUND 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 is not allowed without written approval of the Commissioner.

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 36º, 3 gores for 37º thru 71ºF and 5 gores for 72º thru 90º.

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 AccuFlange, Spiralmate, SEMCO Incorp, or approved equal, 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
   2.

Diameter	Galvanized Sheet Steel Metal Gauges			
	+ 4 in wg	+10” wg	- 4 in wg	-10” wg
3” thru 16”	26	26	24	22

   3. Solid spiral seam inner must be 24 for duct sizes up to 20 inches and 20 gauge for larger ducts.

2.4 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. Finishes for Surfaces Exposed to View: Mill phosphatized.

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

2.5 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 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 Section 233300 "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. Repair 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. Seal class of ducts must be in compliant with 2020 NYCECC as scheduled on plans:

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 Section 233300 "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 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.9 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

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. Remote damper operators
4. Control dampers.
5. Fire dampers.
6. Flange connectors.
7. Turning vanes.
8. Duct-mounted access doors.
9. Flexible connectors.
10. Flexible ducts.
11. Duct accessory hardware.
12. Constant Airflow Regulator (CAR)
13. Sound Attenuators

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.

B. 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.

C. Operation and maintenance data.

1.5 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.

1.6 WARRANTY

A. Manufacturer must provide defective materials and parts warranty extending 12 months from substantial completion.

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 REMOTE DAMPER OPERATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Pottorff; a division of PCI Industries, Inc.
2. Ventfabrics, Inc.
3. Young Regulator Company.
4. Or approved equal

B. Description: Cable system designed for remote manual damper adjustment.

C. Tubing: Brass.

D. Cable: Stainless steel.

E. Wall-Box Mounting: Recessed, 3/4 inches deep.

F. Wall-Box Cover-Plate Material: Stainless steel.

2.5 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

2.6 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.

2.7 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.

2.8 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.

2.9 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.

2.10 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. 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.

2.11 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
4. Or approved equal

B. Noninsulated, Flexible Duct: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire.
   1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.
   2. Maximum Air Velocity: 4000 fpm (20 m/s).
   3. Temperature Range: Minus 20 to plus 210 deg F (Minus 29 to plus 99 deg C).

C. Insulated, Flexible Duct: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
   1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.
   2. Maximum Air Velocity: 4000 fpm (20 m/s).
   3. Temperature Range: Minus 20 to plus 210 deg F (Minus 29 to plus 99 deg C).
   4. Insulation R-value: Comply with ASHRAE/IESNA 90.1-2007

D. Flexible Duct Connectors:
   1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches (75 through 460 mm), to suit duct size.

2.12 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.

2.13 CONSTANT AIRFLOW REGULATOR (CAR)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. American Aldes Ventilation Corporation
   2. Young Regulator Company
   3. Hidria
   4. Or approved equal

B. Constant airflow regulators must solely operate on duct pressure and require no external power supply. Each regulator must be pre-set and factory calibrated, requiring no field adjustment to the airflows as indicated on the drawings, and must be rated for use in air temperatures ranging from -25° to 140°F.

C. Constant Airflow Regulators must be capable of maintaining constant airflow within ±10% of scheduled flow rates, within the operating range of 0.2 to 0.8 in. w.g. differential pressure, or 0.6 to 2.4 in. w.g. on high-pressure models, or 0.1 to 0.42 in. w.g. on low-pressure models. Regulators must be provided as an assembly consisting of an ABS plastic body housed within a round sleeve for mounting in round duct. Each round sleeve must be fitted with a lip gasket

to ensure perimeter air tightness with the interior surface of the duct. All regulators must be classified per UL 2043 and carry the UL mark indicating compliance. All Constant Airflow Regulators will require no maintenance.

2.14 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. The AeroSonics Corporation.
   5. Or approved equal.

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. Silencer manufacturer’s basic installation requirements must not be compromised. Where silencers penetrate acoustical partitions, provide acoustic seal around the silencer.

L. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

M. Install flexible connectors to connect ducts to equipment.

N. 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.

O. Connect terminal units to supply duct directly or with maximum 8-inch lengths of flexible duct. Do not use flexible ducts to change directions.

P. Connect diffusers or light troffer boots to ducts directly or with maximum 24-inch lengths of flexible duct clamped or strapped in place.

Q. Connect flexible ducts to metal ducts with draw bands

R. Install duct test holes where required for testing and balancing purposes.

S. 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 33 53 – DUCT LINERS

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. Duct lining
2. Duct and pipe lagging.

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.

B. Shop Drawings: Show fabrication and installation details.

1.5 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 to verify that noise criteria are met. See Section 230548.13 “Vibration Controls for HVAC” for Vibration Testing and Noise Level Testing by Contractor.
2. The contractor must notify the Commissioner of any changes which will affect the acoustical performance.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

PART 2 - PRODUCTS

2.1 SOUND-LININGS

A. Acoustical performance must be established by ASTM C423-90 procedures. Sound Absorp-

tion 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, minimum 1 inch 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

2.2 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. The Proudfoot Company, Inc.
5. Or approved equal

2.3 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. Seals must be Type SWS as manufactured by Mason Industries, Inc, Sound Seal, Acoustical Solutions, 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 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.

3.4 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.

3.5 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 33 53

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SECTION 23 34 16 – CENTRIFUGAL 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. Section includes:
   1. Centrifugal Exhaust Fans.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

B. 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.

C. Field quality-control test reports.

D. 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, Article 100, UL and marked for intended use.

C. NEMA Compliance: Motors and electrical accessories must comply with NEMA standards.

D. UL Standard: Power ventilators must comply with UL 705.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

PART 2 - PRODUCTS

2.1 ROOF DOWNBLAST CENTRIFUGAL EXHAUST FAN (SPF-1, TX-1)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Greenheck
   2. Loren Cook Company
   3. Aerovent; a Twin City Fan Company.
   4. Howden Fan Co.
   5. Or approved equal

B. General Description:
   1. Base fan performance at standard conditions (density 0.075 Lb/ft3)
   2. Performance capabilities up to 14,500 cubic feet per minute (cfm) and static pressure to 2.75 inches of water gauge
   3. Normal operating temperature up to 180 Fahrenheit (54.4 Celsius)
   4. Applications include: intake, exhaust, return, or make-up air systems
   5. Each fan must bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number

C. Wheel:
   1. Non-overloading, backward inclined centrifugal wheel.
   2. Constructed of aluminum.
   3. Statically and dynamically balanced in accordance to AMCA Standard 204-05.
   4. The wheel cone and fan inlet will be matched and must have precise running tolerances for maximum performance and operating efficiency.
   5. Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.

D. AC Induction Motor
   1. Motor enclosures: Open Drip-Proof.
   2. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.

E. Electronically Commutated Motors:
   1. Motor enclosures: Open type.
   2. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors.
   3. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
   4. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
   5. Motor must be speed controllable down to 20% of full speed (80% turndown). Speed must be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.

6. Motor must be a minimum of 85% efficient at all speeds.

F. Housing / Construction
   1. Motor cover, shroud, curb cap, and lower windband shall be constructed of heavy gauge aluminum
   2. Shroud shall have an integral rolled bead for extra strength
   3. Shroud shall be drawn from a disc and direct air downward
   4. Lower windband shall have a formed edge for added strength
   5. Motor cover shall be drawn from a disc
   6. All housing components shall have final thicknesses equal to or greater then preformed thickness.
   7. Curb cap shall have pre-punched mounting holes to ensure correct attachment
   8. Rigid internal support structure
   9. Leak proof

G. Housing Supports and Drive Frame:
   1. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators
   2. Rubber isolators

H. Combination Starter Disconnect Switches:
   1. NEMA rated: 3R
   2. Positive electrical shut-off
   3. Wired from fan motor to junction box installed within motor compartment

I. Roof Curb:
   1. Types: Welded, straight sided curb with 2 inches of flashing flange and wood nailer
   2. Mounted onto roof with fan
   3. Material: Aluminum
   4. Insulation thickness: 2 inches
   5. Coating Type: None

J. Options/Accessories:
   1. Damper:
      a. Type: Class I low leakage damper, motorized actuator wired to open when fan is on and closed when fan is off.
      b. Balanced for minimal resistance to flow
   2. Hinge Kit:
      a. Aluminum hinges
      b. Allows the fan to tilt away for access to wheel and ductwork for inspection and cleaning.

2.2 DIRECT DRIVE BACKWARD INCLINED CENTRIFUGAL UTILITY FAN (TX-2)

A. General Description:

1. Base fan performance at standard conditions (density 0.075 Lb/ft3).
2. Fans selected shall be capable of accommodating static pressure and flow variations of +/-15% of scheduled values.
3. Each fan shall be direct drive in AMCA arrangement 4 according to drawings.
4. Normal operating temperature up to 104 Degrees Fahrenheit.
5. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.
6. Fans are to be equipped with lifting lugs.
7. Fans include Nema-3R toggle disconnect switch, bolted access door, one inch unthreaded drain hole, and weather-hood as base features.
8. Constructed of heavy gauge painted steel. All interior and exterior surface steel shall be coated with a minimum of 2-4 mils of polyester urethane, electrostatically applied and baked. Finish color shall be RAL-7023, concrete grey.

B. Fan Housing and Outlet
1. Fan housing is to be aerodynamically designed with high-efficiency inlet, engineered to reduce incoming air turbulence.
2. Fan shall be of airtight construction with the scroll panel material formed and embedded into the side panels.
3. Housing shall be constructed of bolted steel members to prevent vibration and rigidly support the motor and wheel.

C. Fan Wheel
1. The fan wheel shall be of the non-overloading single width backward inclined centrifugal type.
2. Constructed of aluminum
3. Wheels shall be statically and dynamically balanced to balance grade G6.3 per ANSI S2.19.
4. Fan wheel shall be manufactured of single thickness blades securely riveted to a heavy gauge back plate and wheel cone.
5. The wheel and fan inlet shall be carefully matched and shall have precise running tolerances for maximum performance and operating efficiency.

D. Fan Motors and Drive
1. Motors shall be open type enclosure and electronic commutation type motor (ECM) specifically designed for fan applications.
2. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
3. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
4. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.
5. Motor shall be a minimum of 85% efficient at all speeds.

E. Options/Accessories:
   1. Combination Starter Disconnect Switches:
      a. NEMA Rated: 3R
      b. Positive electrical shut-off
      c. Access for wiring shall be external
   2. Birdscreen:
      a. Material Type: Galvanized
      b. Protects fan discharge
   3. Vibration Isolation: Restrained spring isolators with minimum 2-inch static deflection

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Install per manufacturer's instructions

B. Install units with clearances for service and maintenance.

C. Label units according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

D. 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 Section 23 33 00 "Air Duct Accessories."

E. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

F. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. 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.
   2. Verify that cleaning and adjusting are complete.

END OF SECTION 23 34 16

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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. Rectangular Grilles and Registers
2. Spiral Duct Mounted Grilles
3. Linear Bar Grille

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, 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.

B. Samples: For each exposed product and for each color and texture specified.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial completion.

PART 2 - PRODUCTS

2.1 SUPPLY AND RETURN GRILLES (SG-1,3,4, RG-X)

A. Steel supply 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.

B. Steel return grilles must be ¾-inch blade spacing of the sizes and mounting types shown on the plans and outlet schedule. The fixed deflection blades must be available parallel to the long or 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 ¾-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.

2.2 SPIRAL DUCT MOUNTED SUPPLY GRILLES (SG-2,5)

A. Aluminum supply grilles must be direct spiral duct-mounted supply grilles, double deflection 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 3/8-inch wide border.

B. Blades must be constructed of heavy-duty extruded aluminum and must be spaced ¾-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. (S8F: perforated face will have 3/16-inch holes on ¼-inch staggered centers.)

C. Air scoop damper/extractor must be constructed of heavy-duty aluminum. The ASD must be operable from the face with a screwdriver.

D. 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.

E. 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 LINEAR BAR GRILLE INLET AND OUTLETS (LBG-1,2)

A. Linear bar diffusers must be with 1/8-inch thick fixed bars at 0° deflection, spaced ¼-inch on center. Linear bar diffusers must be available in standard one-piece lengths up to 6 feet and must have the sizes and mounting types shown on the plans and outlet schedule. Diffuser lengths greater than 6 feet must be furnished in multiple sections and will be joined together end-to-end with alignment strips or pins to form a continuous appearance. All alignment components to be provided by the manufacturer.

B. The diffuser core must have extruded aluminum bars locked into a heavy extruded aluminum border. The deflection bars must be fixed and parallel to the long dimension. The core must have support bars located no more than 9 inches apart and must be parallel to the short dimension.

C. 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.

D. 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.

E. Heavy gauge extruded aluminum end borders and mitered corners must be available to close off the ends of the diffusers. Optional opposed blade damper must be constructed of heavy gauge steel (aluminum also available). Damper must be operable from the face of the diffuser. Optional directional blades and blank-offs must also be available. Optional diffuser curving to a 6-foot minimum radius on most models must be available as required.

F. The manufacturer must provide published performance data for the linear bar diffuser. The diffuser must be tested in accordance with ANSI/ASHRAE Standard 70-1991.

2.4 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

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 237416 - PACKAGED ROOFTOP AIR CONDITIONING 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. This section includes units with integral heating and cooling for outdoor installation. Integral energy recovery device must be a rotary air-to-air total enthalpy wheel. Integral heat source must be indirect Gas-Fired furnace. Integral cooling source must be packaged DX. Airflow arrangement must be outdoor air with recirculation.

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 model include the following
   1. Complete fan performance curves for both Supply Air and Exhaust Air, with system operating conditions indicated, as tested in an AMCA Certified Chamber.
   2. Sound performance data for both Supply Air and Exhaust Air, as tested in an AMCA Certified chamber.
   3. Motor ratings, electrical characteristics and motor and fan accessories.
   4. Performance ratings for all chilled water or DX coils.
   5. Dimensioned drawings for each type of installation, showing isometric and plan views, to include location of attached ductwork and service clearance requirements.
   6. Estimated gross weight of each installed unit.
   7. Installation, Operating and Maintenance manual (IOM) for each model.
   8. Microprocessor Controller (Direct Digital Control) specifications to include available options and operating protocols. Include complete data on all factory-supplied input devices.
   9. AHRI Certified coil performance ratings with system operating conditions indicated. Ratings must be in accordance with Standard 410.
   10. Energy wheel performance data for both summer and winter operation.
   11. Electric consumption data and construction specifications for electric heater, to include heat output, warranty and safety certifications.

B. Shop Drawings: Unit drawings must be provided that indicates assembly, unit dimensions, construction details, clearances, and connection details. Computer generated

fan curves for each fan must be submitted with specific design operation point noted. Wiring diagram must be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Source Limitations: Obtain unit with all appurtenant components or accessories from a single manufacturer.

C. For the actual fabrication, installation, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer's current recommended methods of installation.

D. Unit must exceed ASHRAE 90.1-2016 Energy Efficiency Standards. All units must be ENERGY STAR qualified. EER must equal or exceed value scheduled on plans

E. Unit must be rated in accordance with ARI Standards 210. All units must be designed in accordance with UL Standard 1995. Unit must be rated in accordance with ARI sound standards 270 and 370.

F. Unit must be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

G. Unit must be certified in accordance with ANSI/AHRI 240/260, performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

H. Energy Wheel must be AHRI Certified, per standard 1060.

I. Coils must be Recognized Components for ANSI/UL 1995, CAN / CSA C22.2 No 236.05. DX and water coils must be AHRI Certified per standard 410-2001

J. Unit must be designed to conform to ASHRAE 15, Safety Standard for Mechanical Refrigeration.

K. Insulation and adhesive must meet NFPA 90A requirements for flame spread and smoke generation.

L. Unit casing must be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

M. Unit must be manufactured in a facility registered to ISO 9001:2000.

1.6 COORDINATION

A. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.

B. Coordinate location of water system fittings to ensure correct positioning for connection to condensate drain pipe.

C. Coordinate sequencing of construction of associated plumbing, HVAC, electrical, roofing trades.

1.7 DELIVERY, STORAGE, ANDHANDLING

A. Unit must be shipped with doors bolted shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit must be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation and Maintenancemanual.

1.8 WARRANTY

A. Manufacturer must provide a parts warranty extending 12 months from substantial completion. Warranty must cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for installation, operation and maintenance have been followed.

B. Energy wheel and the drive belt must be warranted for five years from substantial completion.

C. Gas furnace heat exchanger must be warranted for ten years from substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis- of Design Product: Subject to compliance with requirements provide product as manufactured Greenheck Fan Corporation performance and model as scheduled on plans to meet capacity requirements, acoustic performance and overall dimensional and weight requirements or comparable product by one of the followingmanufacturers:

1. Seasons Four, Inc.
2. AAON
3. Trane
4. Or approved equal

2.2 PRODUCT DESCRIPTION

A. Unit must be fully assembled at the factory and consist of an insulated metal cabinet, exhaust air blower, evaporator coil, energy wheel, hot gas reheat coil, packaged DX system, phase and brownout protection, motorized dampers, curb assembly, filter assembly intake air, supply air blower assembly, exhaust/relief blower assembly, filter assembly for exhaust air, and an electrical control center. All specified components and internal accessories factory installed are tested and prepared for single-point high voltage connection

B. Cabinet

1. Materials: Formed, double 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. Pre-painted components as supplied by the factory must have polyester urethane paint on 18-gauge G60 galvaneal steel. Unit's exterior must be supplied from the manufacturer using G60 galvaneal steel with proprietary pre-painted material in the following finish color; Concrete Gray-RAL 7023. This has been subjected to a salt spray test per ASTM-B117 and evaluated using ASTM-D714 and ASTM-D610 showing no observable signs of rust or blistering until reaching 2,500 hours.
   b. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which must be minimum 14 gauge galvanized (G90) steel.
2. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
   a. Materials: Rigid Urethane Foam
   b. Thickness: 2 inch (50 mm)
   c. Meets UL94HF-1 flame requirements.
   d. Location and application: Full coverage of entire cabinet exterior to include walls, roof of unit, unit base, and doors.

C. Access panels / doors: Unit must be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels must be fabricated of 18-gauge galvanized G90 steel or painted galvannealed steel.

D. Supply Air blower assemblies: Blower assembly must consist of an electric motor and direct-drive fans. Assembly must be mounted on heavy gauge galvanized steel rails and further mounted on 1-1/8 inch thick neoprene vibration isolators. Blower motors must be capable of continuous speed modulation and controlled by a VFD.

E. Exhaust Air blower assemblies: Blower assembly must consist of an electric motor and a direct-drive fan. Assembly must be mounted on heavy gauge galvanized steel rails and further mounted on 1-1/8 inch thick neoprene vibration isolators. Blower motor must be capable of continuous speed modulation and controlled by a VFD.

F. Evaporator Coil: Evaporator coil must be AHRI Certified and must be (silver) soldered or brazed into the compressed refrigerant system. Coil must be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a galvanized steel frame. If two compressors are used as components of the unit, then the evaporator coil must be of "interlaced" configuration, permitting independent operation of either compressor without conflict with the other compressor.

G. Control panel / connections: Units 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. RTU must be equipped with a Unit Disconnect Switch.

H. Condensate Drain pan: Drain Pan must be an integral part of the unit whenever a cooling option is included. Pan must be formed of welded austenitic stainless steel sheet material and provided with a welded stainless steel drain connection at the front for connection to

a P trap. Drain pan must be sloped in two directions to provide positive draining and drain connector must be sealed at penetration through cabinet wall.

I. Provide appropriate P trap. Refer to detail on plans for trap pipe size and dimensions.

J. Energy wheel: 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. 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 is designed and constructed to permit cleaning and servicing. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.

K. 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.

L. Hot gas Reheat: Reheat coil with factory installed modulating hot gas reheat valve.

M. Indirect Gas Furnace:
   1. Must be ETL Certified as a component of the unit.
   2. Must have an integral combustion gas blower.
   3. Must be ETL Certified for installation downstream of a cooling coil.
   4. Must have fault sensors to provide fault conditions to optional digital controller or building controls.
   5. Must have 4-pass tubular heat exchangers, constructed of type 409 stainless steel. Heat exchanger tubes must be installed on the vest plate by means of swaged assembly, welded connections are not acceptable. Heat exchanger tubes must be supported and also permit expansion and contraction of the tubes.
   6. Furnace control must be 10:1 Modulating
   7. Must be encased in a weather-tight metal housing with intake air vents. Large, metal door must provide easy access to the enclosed vest plate, control circuitry, gas train, burner assembly, and exhaust blower. Indicate any other requirements such as furnace output, controls, etc.

N. Packaged DX System: Unit must have an integral compressor(s) and evaporator coil located within the weather-tight unit housing. Condenser coils and appurtenant condenser fan assemblies must be factory installed as integral subassemblies of the unit and mounted on the exterior of the unit. Lead condenser fan must have EC motor to maintain condenser pressure at part load conditions. Motors must be UL Recognized and CSA Certified. The refrigerant compressor(s) must be inverter hermetic scroll-type and must be equipped with liquid line filter drier, thermostatic expansion valves (TXV)(s), manual reset high pressure and low-pressure cutouts and all appurtenant sensors, service ports and safety devices. Compressed refrigerant system must be fully charged with R-410A refrigerant. Each compressor must be factory-equipped with an electric crankcase heater to boil off liquid refrigerant from the oil.

O. Packaged DX Control and Diagnostics: The Packaged DX system must be controlled by an onboard direct digital controller that indicates both user-supplied settings and fault conditions that may occur. The direct digital controller must be programmed to indicate the following faults:
   1. Global alarm condition (active when there is at least one alarm)
   2. Supply Air Proving alarm
   3. Dirty Filter Alarm
   4. Compressor Trip alarm
   5. Compressor Locked Out alarm
   6. Supply Air Temperature Low Limit alarm
      a. Sensor #1 Out of Range (outside air temperature)
      b. Sensor #2 Out of Range (supply air temperature)
      c. Sensor #3 Out of Range (cold coil leaving air temperature)

P. Phase and brownout protection: Unit must have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions. Upon detection of a fault, the monitor must disconnect supply voltage to all motors.

Q. Motorized dampers: Motorized dampers of low leakage type must be factory installed. Motorized recirculating air damper designed to permit 100% maximum recirculation of return air must be factory installed

R. Service Receptacle: 120 VAC GFCI service outlet must be factory provided with installation to be field coordinated with electrical trade. Service outlet requires a dedicated single phase electric circuit. Unit contains a 120 VAC transformer to provide power to service outlet.

2.3 BLOWERS

A. Blower section construction, Supply Air: direct drive motor and blower must be assembled on a 14-gauge galvanized steel platform and must be equipped with minimum 1.125 inch thick neoprene vibration isolation devices.

B. Blower assemblies: Must be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

C. Fan: Direct drive, airfoil plenum fan with steel wheels statically and dynamically balanced and AMCA certified for air and sound performance.

D. Blower section motor source quality control: 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".

2.4 MOTORS

A. General: Blower motors greater than 3/4 horsepower must be "NEMA Premium" unless otherwise indicated. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE 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.

B. Motors must be 60 cycle, 3 phase 208 volts.

2.5 UNIT CONTROLS

A. The unit must be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). This unit must be controlled by a factory-installed microprocessor programmable direct digital controller that is connected to various optional sensors.

B. Unit must incorporate a direct digital controller with integral LCD screen that provides text readouts of status. Direct digital controller must have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. Direct digital controllers that require the use of equipment or software that is not factory- installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable. User-specified ventilating conditions can be input by means of pushbuttons.

C. Unit supply fan must be configured as single zone VAV controlled as variable volume variable temperature (VVVT) as follows.
   1. Cooling mode:
      a. With fall in space temperature supply air shall modulate down to 60 % (adjustable) of design air flow at constant supply temperature to meet room setpoint
      b. Once the 60% design flow is reached, unit shall run as constant volume system with supply air temperature reset to meet space setpoint condition.
      c. On rise in space temperature the sequence shall reverse.
   2. Heating mode:
      a. With rise in space temperature supply air shall modulate down to 60 % (adjustable) of design air flow at constant supply temperature to meet room setpoint
      b. Once the 60% design flow is reached, unit shall run as constant volume system with supply air temperature reset to meet space setpoint condition.
      c. On fall in space temperature the sequence shall reverse.

D. Unit exhaust fan must be configured for supply fan tracking

E. Outside Air / Return Air damper control must be network control

F. Economizer control must be temperature / enthalpy.

G. Operating protocol: The direct digital controller must be factory-programmed for BACNet MSTP.

H. Variable Frequency Drive (VFD): unit must have factory installed variable frequency drive for modulation of the supply and exhaust air blower assemblies. The VFD must be factory-programmed for unit-specific requirements and must not require additional field programming to operate.

I. Airflow monitoring is required in all airstreams

2.6 UNIT SEQUENCE OF OPERATION

A. Safety Controls
1. Provide low-limit controller to prevent mixed air from falling below 45°F.
2. Stop fan and close outside air damper on detection of smoke. Provide additional contacts for alarm interface to fire alarm control panel.

B. Operating Modes:
1. The operating modes of the RTU must be automatically determined by the combined input of the building schedule, controls and safety devices.
2. The unit must be automatically indexed to operate in either the cooling and/or dehumidification mode or heating mode based on space temperature and humidity and space setpoint temperature. Unit controller shall be programmed for following features:
   a. Unoccupied Heating – unit shall be cycled to maintain night setup setpoint 65deg F (adjustable).
   b. Unoccupied Cooling - unit shall be cycled to maintain night setup setpoint 85deg F (adjustable).
   c. Morning Startup – Optimized morning startup to minimize Warmup / Cool down cycle
3. Occupied Mode: Unit shall be sequenced in heating, economizer, cooling, dehumidification and reheat to maintain occupied space air temperature and humidity setpoints.
   a. Gas Furnace - ON at 68 deg F, OFF at 74 deg F – modulate to meet space setpoint of 72 deg F
   b. Mechanical Cooling: ON at 76 deg F, OFF at 72 deg F – modulate to meet space setpoint of 74 deg F.
   c. Dehumidification and Reheat: Supply air dewpoint not to exceed 57 deg F.
   d. Economizer: For outdoor temperatures between 55 F and 65 deg F the unit may not be in the Economizer Mode depending on the enthalpy of the outside air as compared to the enthalpy of the return air. The Mode must be determined by comparison of the controller's calculated return air enthalpy to the calculated global outside air enthalpy. When the outside air enthalpy is less than the return enthalpy the air handling unit must be indexed to the Economizer Mode. When the outside air enthalpy is greater than the return enthalpy, the air handling unit must be indexed to Summer Mechanical Cooling Mode with modulating hot gas reheat activated to maintain space temperature and humidity.

2.7 FILTERS

A. Unit must have permanent metal filters located in the outdoor air intake and must be accessible from the exterior of the unit. MERV 8 disposable pleated filters must be provided in the supply air stream. MERV 8 and MERV 13 disposable pleated filters must be provided in the supply final air stream and MERV 8 filters in the exhaust air stream.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. Refer to unit Installation and Operation Manual.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. Refer to unit Installation and Operation Manual.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install unit on steel dunnage.

B. Coordinate location of remote unit controller with Commissioner.

C. Install piping adjacent to machine to allow service and maintenance.

D. Duct Connections: Connect supply and return ducts to rooftop replacement-air units with flexible duct connectors.

E. Electrical Connections: Comply with requirements in Section 26 29 13 “Enclosed Controllers”.

F. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections.

B. Report results in writing to Commissioner. Inspection must include a complete startup checklist included in unit Installation and Operation Manual.

3.5 STARTUP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Section 23 05 93 "Testing, Adjusting and Balancing for HVAC " and comply with provisions therein

B. Complete installation and startup check according to manufacturer's written instructions and perform the following:

1. Inspect for visible damage to furnace combustion chamber.

2. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
3. Inspect casing insulation for integrity, moisture content, and adhesion.
4. Verify that controls are connected and operable.
5. Clean outside coil and inspect for construction debris.
6. Clean furnace flue and inspect for construction debris.
7. Inspect operation of power vents.
8. Purge gas line.
9. Verify bearing lubrication.
10. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
11. Adjust fan belts to proper alignment and tension.
12. Start unit.
13. Start refrigeration system when outdoor-air temperature is within normal operating limits.
14. Inspect and record performance of interlocks and protective devices including response to smoke detectors by fan controls and fire alarm.
15. Operate unit for run-in period.
16. Perform the following operations for both minimum and maximum firing and adjust burner for peak efficiency:
    a. Measure gas pressure at manifold.
    b. Measure combustion-air temperature at inlet to combustion chamber.
    c. Measure flue-gas temperature at furnace discharge.
    d. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
    e. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.
17. Calibrate and program thermostats.
18. Calibrate and adjust CO2 sensor for demand control ventilation (DCV). Confirm proper operation of DCV.
19. Adjust and inspect high-temperature limits.
20. Start refrigeration system and measure and record the following:
    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
21. Verify operational sequence of controls.
22. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
    a. High-limit heat exchanger.
    b. Alarms.
23. After startup and performance testing, change filters, verify bearing lubrication, and adjust belt tension.

24. Remove and replace components that do not pass tests and inspections and retest as specified above.
25. Prepare written report of the results of startup services.

3.6 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.7 DEMONSTRATION AND INSTRUCTION

A. Engage a factory-authorized service representative to instruct facility's maintenance personnel to adjust, operate, and maintain rooftop units.

END OF SECTION 23 74 16

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SECTION 23 74 33 – DEDICATED OUTDOOR AIR 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. This section includes dedicated 100% outdoor air units with integral heating and cooling for rooftop installation. Integral Energy Recovery device must be a rotary air-to-air total enthalpy wheel. Integral heat source must be electric heat. Integral cooling source must be packaged DX. Airflow arrangement must be Outdoor Air only. Each unit must be constructed in a horizontal configuration and must incorporate additional product requirements as listed in Part 2 of this specification.

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 model include the following
   1. Complete fan performance curves for both Supply Air and Exhaust Air, with system operating conditions indicated, as tested in an AMCA Certified Chamber.
   2. Sound performance data for both Supply Air and Exhaust Air, as tested in an AMCA Certified chamber.
   3. Motor ratings, electrical characteristics and motor and fan accessories.
   4. Performance ratings for all chilled water or DX coils.
   5. Dimensioned drawings for each type of installation, showing isometric and plan views, to include location of attached ductwork and service clearance requirements.
   6. Estimated gross weight of each installed unit.
   7. Installation, Operating and Maintenance manual (IOM) for each model.
   8. Microprocessor Controller (Direct Digital Control) specifications to include available options and operating protocols. Include complete data on all factory-supplied input devices.
   9. AHRI Certified coil performance ratings with system operating conditions indicated. Ratings must be in accordance with Standard 410.
   10. Energy wheel performance data for both summer and winter operation.
   11. Electric consumption data and construction specifications for electric heater, to include heat output, warranty and safety certifications.

B. Shop Drawings: Unit drawings must be provided that indicates assembly, unit dimensions, construction details, clearances, and connection details. Computer generated fan curves for each fan must be submitted with specific design operation point noted. Wiring diagram must be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Source Limitations: Obtain unit with all appurtenant components or accessories from a single manufacturer.

C. For the actual fabrication, installation, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer's current recommended methods of installation.

D. Unit must exceed ASHRAE 90.1-2016 Energy Efficiency Standards. All units must be ENERGY STAR qualified. EER must equal or exceed value scheduled on plans

E. Unit must be rated in accordance with ARI Standards 210. All units must be designed in accordance with UL Standard 1995. Unit must be rated in accordance with ARI sound standards 270 and 370.

F. Unit must be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

G. Unit must be certified in accordance with ANSI/AHRI 240/260, performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

H. Coils must be Recognized Components for ANSI/UL 1995, CAN / CSA C22.2 No 236.05. DX and water coils must be AHRI Certified per standard 410-2001

I. Unit must be designed to conform to ASHRAE 15, Safety Standard for Mechanical Refrigeration.

J. Insulation and adhesive must meet NFPA 90A requirements for flame spread and smoke generation.

K. Unit casing must be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

L. Unit must be manufactured in a facility registered to ISO 9001:2000.

1.6 COORDINATION

A. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.

B. Coordinate location of water system fittings to ensure correct positioning for connection to condensate drain pipe.

C. Coordinate sequencing of construction of associated plumbing, HVAC, electrical, roofing trades.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Unit must be shipped with doors bolted shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit must be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation and Maintenance manual.

1.8 WARRANTY

A. Manufacturer must provide a parts warranty extending 12 months from substantial completion. Warranty must cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for installation, operation and maintenance have been followed.

B. Gas furnace heat exchanger must be warranted for 10 years form substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis- of Design Product: Subject to compliance with requirements provide product as manufactured Greenheck Fan Corporation performance and model as scheduled on plans to meet capacity requirements, acoustic performance and overall dimensional and weight requirements or comparable product by one of the following manufacturers:
   1. Seasons Four, Inc.
   2. AAON
   3. Trane
   4. Or approved equal

2.2 PRODUCT DESCRIPTION

A. Unit must be fully assembled at the factory and consist of an insulated metal cabinet, exhaust air blower, evaporator coil, energy wheel, hot gas reheat coil, packaged DX system, phase and brownout protection, motorized dampers, curb assembly, filter assembly intake air, supply air blower assembly, exhaust/relief blower assembly, filter assembly for exhaust air, and an electrical control center. All specified components and internal accessories factory installed are tested and prepared for single-point high voltage connection

B. Cabinet
   1. Materials: Formed, double 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. Pre-painted components as supplied by the factory must have polyester urethane paint on 18 gauge G60 galvaneal steel. Unit's exterior must be supplied from the manufacturer using G60 galvaneal steel with proprietary pre-painted material in the following finish color; Concrete Gray-RAL 7023. This has been subjected to a salt spray test per ASTM-B117 and evaluated using ASTM-D714 and ASTM-D610 showing no observable signs of rust or blistering until reaching 2,500 hours.
b. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which must be minimum 14 gauge galvanized (G90) steel.

2. Cabinet Insulation:
   a. Material: Rigid Urethane Foam.
   b. Thickness: 2- inch.
   c. Meets UL94HF-1 flame requirements.
   d. Location and application: Full coverage of entire cabinet exterior to include walls, roof of unit, unit base, and doors.

C. Access panels / doors: Unit must be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels must be fabricated of 18-gauge galvanized G90 steel or painted galvannealed steel.

D. Supply Air blower assemblies: Blower assembly must consist of an electric motor and direct-drive fans. Assembly must be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motors must be capable of continuous speed modulation and controlled by a VFD.

E. Exhaust Air blower assemblies: Blower assembly must consist of an electric motor and a direct-drive fan. Assembly must be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor must be capable of continuous speed modulation and controlled by a VFD.

F. Evaporator Coil: Evaporator coil must be AHRI Certified and must be (silver) soldered or brazed into the compressed refrigerant system. Coil must be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a galvanized steel frame. If two compressors are used as components of the unit, then the evaporator coil must be of "interlaced" configuration, permitting independent operation of either compressor without conflict with the other compressor.

G. Control panel / connections: Units 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. RTU must be equipped with a Unit Disconnect Switch.

H. Condensate drain pan: Drain Pan must be an integral part of the unit whenever a cooling option is included. Pan must be formed of welded austenitic stainless steel sheet material and provided with a welded stainless steel drain connection at the front for connection to a P trap. Drain pan must be sloped in two directions to provide positive draining and drain connector must be sealed at penetration through cabinet wall.

I. Provide appropriate P trap. Refer to detail on plans for trap pipe size and dimensions.

J. 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.

K. Hot Gas Reheat: Reheat coil with factory installed modulating hot gas reheat valve.

L. Indirect Gas Furnace:
1. Must be ETL Certified as a component of the unit.
2. Must have an integral combustion gas blower.
3. Must be ETL Certified for installation downstream of a cooling coil.
4. Must have fault sensors to provide fault conditions to optional digital controller or building controls.
5. Must have 4-pass tubular heat exchangers, constructed of type 409 stainless steel. Heat exchanger tubes must be installed on the vest plate by means of swaged assembly, welded connections are not acceptable. Heat exchanger tubes must be supported and also permit expansion and contraction of the tubes.
6. Furnace control must be 10:1 Modulating
7. Must be encased in a weather-tight metal housing with intake air vents. Large, metal door must provide easy access to the enclosed vest plate, control circuitry, gas train, burner assembly, and exhaust blower. Indicate any other requirements such as furnace output, controls, etc.

M. Packaged DX System: Unit must have an integral compressor(s) and evaporator coil located within the weather-tight unit housing. Condenser coils and appurtenant condenser fan assemblies must be factory installed as integral subassemblies of the unit and mounted on the exterior of the unit. Lead condenser fan must have EC motor to maintain condenser pressure at part load conditions. Motors must be UL Recognized and CSA Certified. The refrigerant compressor(s) must be inverter hermetic scroll-type and must be equipped with liquid line filter drier, thermostatic expansion valves (TXV)(s), manual reset high pressure and low pressure cutouts and all appurtenant sensors, service ports and safety devices. Compressed refrigerant system must be fully charged with R-410A refrigerant. Each compressor must be factory-equipped with an electric crankcase heater to boil off liquid refrigerant from the oil.

N. Packaged DX Control and Diagnostics: The Packaged DX system must be controlled by an onboard direct digital controller that indicates both user-supplied settings and fault conditions that may occur. The direct digital controller must be programmed to indicate the following faults:
1. Global alarm condition (active when there is at least one alarm)
2. Supply Air Proving alarm
3. Dirty Filter Alarm
4. Compressor Trip alarm
5. Compressor Locked Out alarm
6. Supply Air Temperature Low Limit alarm
    a. Sensor #1 Out of Range (outside air temperature)
    b. Sensor #2 Out of Range (supply air temperature)

c. Sensor #3 Out of Range (cold coil leaving air temperature)

O. Phase and brownout protection: Unit must have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions. Upon detection of a fault, the monitor must disconnect supply voltage to all motors.

P. Motorized dampers / Intake Air, Motorized dampers of low leakage type must be factory installed.

Q. Curb Assembly: Where noted on plans a curb assembly made of 14 gauge galvanized steel must be provided by the factory for assembly and installation as part of this division. The curb assembly must provide perimeter support of the entire unit and must have duct adapter(s) for supply air and return air. Curb assembly must enclose the underside of the unit and must be sized to fit into a recess in the bottom of the unit. Contractor is responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor must provide and install appropriate insulation for the curb assembly. The curb must be the height of 14 in

R. Service Receptacle: 120 VAC GFCI service outlet must be factory provided with installation to be field coordinated with electrical trade. Service outlet requires a dedicated single phase electric circuit. Unit contains a 120 VAC transformer to provide power to service outlet.

2.3 BLOWERS

A. Blower section construction, Supply Air: direct drive motor and blower must be assembled on a 14-gauge galvanized steel platform and must be equipped with 1.125 inch thick neoprene vibration isolation devices.

B. Blower assemblies: Must be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

C. Fan: Direct drive, airfoil plenum fan with steel wheels statically and dynamically balanced and AMCA certified for air and sound performance.

D. Blower section motor source quality control: 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".

2.4 MOTORS

A. General: Blower motors greater than 3/4 horsepower must be "NEMA Premium" unless otherwise indicated. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE 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.

B. Motors must be 60 cycle, 3 phase 208 volts.

2.5 UNIT CONTROLS

A. The unit must be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). This unit must be controlled by a factory-installed microprocessor programmable direct digital controller that is connected to BMS.

B. Unit must incorporate a direct digital controller with integral LCD screen that provides text readouts of status. Direct digital controller must have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. Direct digital controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable. User-specified ventilating conditions can be input by means of pushbuttons.

C. Unit supply fan must be configured for Constant Volume (ON/OFF).

D. Outside Air damper control must be filed adjustable two position.

E. Economizer control must be temperature / enthalpy.

F. Operating protocol: The direct digital controller must be factory-programmed for BACNet MSTP.

G. Variable Frequency Drive (VFD): unit must have factory installed variable frequency drive for modulation of the supply air blower assemblies. The VFD must be factory-programmed for unit-specific requirements and must not require additional field programming to operate.

H. VFD shall have auxiliary contacts for duct smoke detector shutdown and firemen's override.

I. Must incorporate outdoor airflow monitoring in supply are stream.

2.6 UNIT SEQUENCE OF OPERATION

A. Safety Controls
   1. Provide low-limit controller to prevent mixed air from falling below 45°F.
   2. Stop fan and close outside air damper on detection of smoke. Provide additional contacts for alarm interface to fire alarm control panel.

B. Operating Modes:
   1. The operating modes of the RTU must be automatically determined by the combined input of the building schedule, controls and safety devices.
   2. The unit must be automatically indexed to operate in either the cooling and/or dehumidification mode or heating mode based on space temperature and humidity and space setpoint temperature. Unit controller shall be programmed for following features:
      a. Unoccupied Heating – unit shall be cycled to maintain night setup setpoint 65deg F (adjustable).

b. Unoccupied Cooling - unit shall be cycled to maintain night setup setpoint 85deg F (adjustable).
c. Morning Startup – Optimized morning startup to minimize Warmup / Cool down cycle

3. Occupied Mode: Unit shall be sequenced in heating, economizer, cooling, dehumidification and reheat to maintain occupied space air temperature and humidity setpoints.
   a. Gas Furnace - ON at 68 deg F, OFF at 74 deg F – modulate to meet space setpoint of 72 deg F
   b. Mechanical Cooling: ON at 76 deg F, OFF at 72 deg F – modulate to meet space setpoint of 74 deg F
   c. Dehumidification and Reheat: Supply air dewpoint not to exceed 57 deg F.
   d. Economizer: For outdoor temperatures between 55 F and 65 deg F, when the outside air dewpoint is less than the space dewpoint the air handling unit must be indexed to the Economizer Mode. When the outside air dewpoint is greater than the space dewpoint, the air handling unit must be indexed to Summer Mechanical Cooling Mode with modulating hot gas reheat activated to maintain space temperature and humidity.

2.7 FILTERS

A. Unit must have permanent metal filters located in the outdoor air intake and must be accessible from the exterior of the unit. MERV 8 disposable pleated filters must be provided in the supply air stream. MERV 8 and MERV 13 disposable pleated filters must be provided in the supply final air stream and MERV 8 filters in the exhaust air stream.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. Refer unit Installation and Operation Manual.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. Refer unit Installation and Operation Manual.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install unit on steel dunnage.

B. Coordinate location of remote unit controller with Commissioner.

C. Install piping adjacent to machine to allow service and maintenance.

D. Duct Connections: Connect supply and return ducts to rooftop replacement-air units with flexible duct connectors.

E. Electrical Connections: Comply with requirements in Section 26 29 13 “Enclosed Controllers”.

F. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections.

B. Report results in writing to Commissioner. Inspection must include a complete startup checklist included in unit Installation and Operation Manual.

3.5 STARTUP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Section 23 05 93 "Testing, Adjusting and Balancing for HVAC " and comply with provisions therein

B. Complete installation and startup check according to manufacturer's written instructions and perform the following:
   1. Inspect for visible damage to furnace combustion chamber.
   2. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
   3. Inspect casing insulation for integrity, moisture content, and adhesion.
   4. Verify that controls are connected and operable.
   5. Clean outside coil and inspect for construction debris.
   6. Clean furnace flue and inspect for construction debris.
   7. Inspect operation of power vents.
   8. Purge gas line.
   9. Verify bearing lubrication.
   10. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
   11. Adjust fan belts to proper alignment and tension.
   12. Start unit.
   13. Start refrigeration system when outdoor-air temperature is within normal operating limits.
   14. Inspect and record performance of interlocks and protective devices including response to smoke detectors by fan controls and fire alarm.
   15. Operate unit for run-in period.

16. Perform the following operations for both minimum and maximum firing and adjust burner for peak efficiency:
    a. Measure gas pressure at manifold.
    b. Measure combustion-air temperature at inlet to combustion chamber.
    c. Measure flue-gas temperature at furnace discharge.
    d. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
    e. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.
17. Calibrate and program thermostats.
18. Calibrate and adjust CO2 sensor for demand control ventilation (DCV). Confirm proper operation of DCV.
19. Adjust and inspect high-temperature limits.
20. Start refrigeration system and measure and record the following:
    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
21. Verify operational sequence of controls.
22. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
    a. High-limit heat exchanger.
    b. Alarms.
23. After startup and performance testing, change filters, verify bearing lubrication, and adjust belt tension.
24. Remove and replace components that do not pass tests and inspections and retest as specified above.
25. Prepare written report of the results of startup services.

3.6 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.7 DEMONSTRATION AND INSTRUCTION

A. Engage a factory-authorized service representative to instruct the facility's maintenance personnel to adjust, operate, and maintain rooftop units.

END OF SECTION 23 74 33

SECTION 23 81 13.11 - PACKAGED TERMINAL AIR CONDITIONERS – THROUGH WALL 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. Thru-the-wall packaged heating pump units.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: Manufacturer's standard data sheets and descriptive literature.

B. Catalog pages and cut-sheets illustrating specified products.

C. Manufacturer's installation instruction manuals.

D. Shop Drawings and Wiring Schematics: Showing metal thicknesses, dimensions, reinforcing and finishing.

E. Wiring and piping diagrams.

F. Technical Documentation: Equipment operation, replacement parts, Owner's operations and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Manufacturer Qualifications: Minimum 3-year experience manufacturing similar products.

1.6 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI): AHRI210-240, Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment with Addenda 1 and 2.

B. National Fire Prevention Association (NFPA):

C. NFPA 54/ANSI Z223.1, National Fuel Gas Code and Handbook Set.

D. NFPA (Fire) 70-201, National Electrical Fire Code.

E. Underwriter's Laboratories: UL 1995 Heating and Cooling Equipment.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver and store products in manufacturer's original, unopened, undamaged containers with identification labels intact and product name and manufacturer clearly visible.

B. Protect products from exposure to harmful environmental conditions, clean, dry, frost-free and at recommended temperature and humidity levels.

C. Handle materials as recommended by manufacturer to avoid damage.

1.8 WARRANTY

A. Manufacturer's standard warranty document executed by authorized company official.
   1. Parts: 2 years for parts from substantial completion
   2. Compressor: 5 years for parts form substantial completion

PART 2 - PRODUCTS

2.1 THROUGH WALL HEAT PUMP UNIT

A. Manufacturer: Subject to performance requirements as indicated on plans and as specified herein for the basis of design manufacturer provide by the following manufacturers:
   1. Friedrich
   2. Rheem
   3. GE
   4. Or approved equal

B. Single Packaged Unit: Pre-charged and prewired, self- contained heat pump heating and cooling unit facilitating easy installation and maintenance. Easily reachable cooling access ports. Polarized Molex plug connections on the chassis.

C. Performance Requirements:
   1. Seasonal Energy Efficiency Ratio in compliance with ASHRAE 90.1 2016

D. Standards Compliance:
   1. AHRI 210-240.
   2. NFPA 70.
   3. NFPA 54.
   4. UL 1995.

E. Construction
   1. Thru-Wall Style:
   2. Heat Pump Indoor Air Flow: Approved for front/open return
   3. Outlet: Top Supply.
   4. Inlet: Bottom Return.
   5. Cabinet Construction: Pre-painted 22 gauge, 0.0336 in (0.853 mm) galvanized steel.
   6. Color: Neutral tone finish of tan.
   7. Grill: Factory standard
   8. Filter: Factory washable air inlet filter easily accessed by thumb screw mounted panel w/ filter retainer rod.

F. Refrigeration Module:
1. High Efficiency Compressor: R-410A.
2. Slide out cooling chassis with refrigeration service ports.
3. Evaporator coil: Raised lance aluminum fins mechanically bonded to seamless rifled copper tubes.
4. Condenser Coil: Condenser aluminum microchannel.
5. Drain Pan: Positioned underneath the evaporator coil to collect condensate.
6. Primary Drain: 3/4 in (19 mm) outside diameter primary drain connection with flexible tubing connected to the drain connection on the drain pan so it can be easily disconnected for chassis removal.
7. Installed by other trades: 2 in (51 mm) deep trap close to the pan . The drain line should pitch downward at least 1 in (25 mm) per 10 ft (3048 mm) to an open building drain trap.
8. Secondary Condensate Drain. Trap piped to outdoor section of unit for drainage thru exterior weep holes providing extra protection and indication of primary drain blockages.

G. Electrical Requirements:
1. Factory wired for 230 Volts 1 Phase 60 Hertz.
2. Field adjustable for 208 Volts.
3. CPE ratings are based at 230 Volts.
4. Low Voltage: The unit is supplied with a 40 VA transformer used to bring 24 VAC into the control section of the unit.

H. Electrical Components, Devices and Accessories:
1. Listed and labeled in compliance with NFPA 70 by a qualified testing agency.
2. Marked for intended location and application.
3. Low Voltage:
   a. Factory mounted junction box for field wiring thermostat.
   b. Thermostat: Low voltage.

I. Accessories:
1. Wall Sleeve: Field assembled pre-painted aluminum casing with galvanized steel casing,
2. Flashing per Section 07 62 00 - Sheet Metal Flashing and Trim.
3. Caulking per Section 07 92 00 - Joint Sealants.

2.2 CONDENSATE PUMP

A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. Sauermann
2. Little Giant
3. Aspen
4. Or approved equal.

B. Provide tank condensate pump for unit primary drain
1. Rugged material and construction
2. Half (1/2) gallon capacity.
3. Float design resistant to fouling
4. Stainless steel motor shaft
5. Suitable for floor or wall mount or suspended form ceiling.
6. Removable anti-return valve.
7. Duty: Shut-off head 22 feet, maximum flow 15 gph.
8. Electrical Characteristic: 120V/1 Ph/60 Hz (1.7 Amps)

9. Safeties: Safety switch. thermal protection with auto-reset.
10. Sound Level: 45 dBA maximum measured at 1 meter from pump.
11. IP Index: IP44

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 COORDINATION

A. Coordinate preparation of wall opening.

3.3 PREPARATION

A. Prepare conditions using the methods recommended by the manufacturer for achieving the best result for the operation under the project conditions.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction including the following.
   1. Wall sleeve and unit.
   2. Drain pan trap and connection to drainage system.
   3. Electrical connections per NFPA 70.
   4. Caulk exterior of unit and wall sleeve to substrate.
   5. Weep hole openings in exterior front section of unit base pan must be clear and open for drainage of unit.
   6. Clearance Tolerances per manufacturer's written instructions:
      a. Clearance at exterior of unit for unobstructed air flow around unit.
      b. Clearance at interior of unit for maintenance purposes.
      c. Minimum vertical and horizontal clearance between units.

3.5 CLEANING

A. Upon completion of unit installation, remove surplus materials, rubbish, tools and equipment.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 23 81 13.11

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 small capacity split system air conditioners

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. 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 (kW)
3. Capacities at project design conditions: Heating (Btu/h)
4. Heating Input Power (kW)
5. Full Load COP@47F
6. Full Load COP@17F

B. 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. Octave Band Sound Power Level. (dBA)

b. Weight (lbs)
c. Dimensions

C. 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 (inches).

D. 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
5. Defrost De-rate Factor: 0.85
6. Refrigerant Piping Loss: 0.027

1.5 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. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system must be factory tested for safety and function.

E. 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.

F. The condensing unit will be factory charged with R410A.

G. System efficiency must meet or exceed 18 SEER and 8.5 HSPF.

H. 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 a wall mounted evaporator model exclusively matched to outdoor model form a single manufacturer, direct expansion (DX), air-cooled, swing, variable speed, inverter driven compressor using R-410A refrigerant. The outdoor unit is a horizontal discharge, variable

speed, single fan unit using a single-phase power supply. The system must have a self-diagnostic function, 3-minute time delay mechanism and have a factory pre-charge of R-410A adequate for 33 feet of total length. The system must have automatic restart capability after a power failure has occurred and a low voltage cut-off feature to prevent stalling during power supply issues.

1.6 SYSTEM FEATURES AND BENEFITS

A. Voltage Platform – Heat pump condensing units must be available with a 208-230V/3/60 power supply.

B. Advanced Zoning – A single system must provide for up to 62 zones.

C. Autocharging – 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 49ft 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 must use 16/18 AWG, 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.

K. Outside Air – Systems must provide outside air capability.

L. Space Saving – Each system must have a condensing unit module footprint as small as 3’ 5/8” x 2’ 6-1/8” (7.66sq ft).

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 and LonWorks building management systems.

Q. Low Sound Levels – Each system must use indoor and condensing units with quiet operation as low as 27 dB(A).

1.7 DELIVERY AND STORAGE

A. Unit must be stored and handled according to the manufacturer’s recommendations.

1.8 DELIVERY, STORAGE AND HANDLING

A. Unit must be stored and handled according to the manufacturer’s recommendations.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace equipment and components that fail(s) in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.
b. Faulty operation.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period:

a. For Parts, Including Controls: 1 year from date of Substantial Completion.
b. For Compressor, and Compressor parts: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. Daikin.
2. LG Inc.
3. Mitsubishi.

4. Or approved equal.

2.2 PERFORMANCE

A. The system performance must be in accordance with ARI 210/240 test conditions and must perform as indicated below.

Cooling Capacity (min.~max.)	Heating Capacity (min.~max.)	Cooling Power (watts)	Heating Power (watts)	SEER	EER	HSPF
5,800~15,000	5,800~21,200	280~1,250	260~2,160	18	12.0	8.5
5,800~18,000	5,800~24,000	1,460~ 4,540	1,460~6,050	18	12.0	8.5
5,800~22,000	5,800~25,400	300~2,560	270~2,720	18	8.6	8.5

B. 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.

C. Operating Range
   1. The operating range in cooling will be 14°F DB ~ 115°F DB, and 0ºF DB~115ºF with wind baffle.
   2. The operating range in heating will be 5°F DB – 64°F WB

2.3 REFRIGERANT PIPING

A. The system must be capable of maximum refrigerant piping of 98 feet, with 66 feet maximum vertical difference, without any oil traps or additional components.

2.4 CONDENSING UNIT

A. General: The outdoor unit must be specifically matched to the corresponding indoor unit size. The outdoor unit must be complete factory assembled and pre-wired with all necessary electronic and refrigerant controls.

B. Unit Cabinet: The outdoor 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 fan must be a direct drive, propeller type fan.
   2. The motor must be inverter driven, permanently lubricated type bearings, inherent.
   3. The fan must be capable of operating in “silent operation” which lowers the outdoor fan speed in either cool, heat or auto modes.
   4. A fan guard is provided on the outdoor unit to prevent contact with fan operation.
   5. Airflow must be horizontal discharge.

D. Coil
   1. The outdoor coil must be nonferrous construction with corrugated fin tube.
   2. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.

3. Refrigerant flow from the condenser will be controlled via a metering device.

E. Compressor
1. The compressor must be a swing inverter-driven compressor.
2. The outdoor unit must have an accumulator and four-way reversing valve.
3. The compressor must have an internal thermal overload.
4. The outdoor unit can operate with a maximum vertical height difference of 66 feet and overall maximum length of 98 feet without any oil traps or additional components.

F. Electrical
1. The electrical power requirement is 208-230 volt, 1-phase, and 60 Hz power.
2. The voltage range limitations must be a minimum of 187 volts and a maximum of 253 volts.
3. The outdoor must be controlled by a microprocessor located in the outdoor and indoor units via commands from the infrared remote controller.
4. Dedicated EEV's must be provided for capacity control during part load of the indoor unit.

G. Sound
1. Outdoor unit sound must not exceed 54 dBA – both in cooling and heating mode when measure 3 feet away from the unit.

2.5 WALL MOUNT DUCTLESS INDOOR UNIT

A. General: The indoor unit must be factory assembled and pre-wired with all necessary electronic and refrigerant controls. Both liquid and suction lines must be individually insulated between the outdoor and indoor units.

B. Unit Cabinet
1. The indoor unit must have a white, "flat screen" finish.
2. The drain and refrigerant piping must be accessible from six (6) positions for flexible installation (right side, right back, and right bottom; and left side, left back, and left bottom).
3. The cabinet must be supplied with a mounting plate to be installed onto a wall for securely mounting the cabinet.

C. Fan
1. The evaporator fan must be an assembly consisting of a direct-driven fan by a single motor.
2. The fan must be statically and dynamically balanced and operate on a motor with permanent lubricated bearings.
3. An auto-swing louver for adjustable air flow (vertically) is standard via the wireless remote control furnished with each system.
4. The indoor fan must offer a choice of five speeds, plus quiet and auto settings.

D. Filter: The return air filter provided will be a mildew proof, removable and washable filter. Optional photo catalytic, air purifying filters are available.

E. Coil
1. The evaporator coil must be a nonferrous, aluminum fin on copper tube heat exchanger.
2. All tube joints must be brazed with silver alloy or phos-copper.
3. All coils will be factory pressure tested.
4. A condensate pan must be provided under the coil with a drain connection.

F. Electrical

1. The outdoor unit must be powered with 208-230 volts, 1 phase, and 60 hertz power. The indoor unit must receive 208-230 volt, 1 phase, 60 hertz power from the outdoor unit.
2. The allowable voltage range must be 187 volts to 253 volts.

G. Control

1. The unit must have a backlit, wireless remote infra-red controller capable to operate the system. It must have Cooling Operation, Heating Operation, Automatic Operation, Dry Operation and Fan Only Operation.
2. The controller must consist of an On/Off Power switch, Mode Selector, Fan Setting, Swing Louver, On/Off Timer Setting, Temperature Adjustment, °C or °F Temperature Display, and Powerful Operation.
   a. On/Off switch powers the system on or off.
   b. Mode selector must operate the system in auto, cool, heat, fan or dry operation
   c. Fan setting must provide five fan speeds, plus quiet and auto settings.
   d. Swing louver must adjust the airflow (horizontal and vertical) blades.
   e. On/Off timer is used for automatically switching the unit on or off.
   f. Temperature adjustment allows for the increase or decrease of the desired temperature.
   g. Powerful operation allows quick cool down or heating up in the desired space to achieve maximum desired temperature in the shortest allowable time period.
3. The remote control must perform Fault Diagnostic functions which may be system related, indoor unit or outdoor unit related depending on the fault code.
4. Temperature range on the remote control must be 64°F to 90°F in cooling mode and 50°F to 86°F in heating mode.
5. The indoor unit microprocessor has the capability to receive and process commands via return air temperature and indoor coil temperature sensors enabled by commands from the remote control.

H. Sound: Indoor unit sound levels must not exceed 46/42/37 dB(A) at high, medium and low speed in both heating and cooling mode when measure approximately 3 feet from the unit.

I. Accessory Drain Pump: Provide submersible condensate drain pump to lift condensate, designed to fit within the unit drain pan. Pump must be installed within the unit.

2.6 CONCEALED CEILING DUCTED UNIT

A. General: AC indoor unit must be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, direct-drive DC (ECM) type fan with auto CFM adjustment at commissioning, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It must be available in capacities from 7,500 Btu/h to 48,000 Btu/h. to be connected to outdoor unit. 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. Included as standard equipment, a condensate drain pan and drain pump kit that pumps to 18-3/8” from the drain pipe opening. The indoor units sound pressure must range from 29 dB(A) to 40 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 be equipment with automatically adjusting external static pressure logic that is selectable during commissioning. This adjusts the airflow based on the installed external static pressure.
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 condensate pan and condensate pump. The condensate pump provides up to 18-3/8" of lift from the center of the drain outlet.
5. The indoor units must be equipped with a return air thermistor.
6. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
7. 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 DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.
2. The unit must be equipment with automatically adjusting external static pressure logic selectable during commissioning.
3. The fan motor must operate on 208/230 volts, 1 phase, 60 hertz with a motor output range of 0.12 to 0.47 HP respectively.
4. The airflow rate must be available in three settings.
5. The fan motor must be thermally protected.
6. The fan motor must be equipped as standard with adjustable external static pressure (ESP) settings.
7. Fan motor external static pressure range 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 1-1/4" outside diameter PVC.
5. A condensate pan must be located under the coil.
6. A condensate pump with an 18-3/8" lift must be located below the coil in the condensate pan with a built in safety alarm.
7. 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 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.
4. The unit must be compatible with a intelligent touch advanced multi-zone controller.

I. Accessories must include:
1. A high efficiency disposable MERV 13 air filter kit including filters

2.7 REMOTE CONTROLLER

A. The Remote Controller can provide control for all indoor units. The remote controller wiring consist of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s).

B. Mounting: The Remote Controller must be mounted into a standard 2” x 4” junction box.

C. Display Features:
1. The 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 (0-176°F/-17-80°C 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)
      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 + 1ºF (0.5ºC)
      b. Changeover to heating mode must occur at heating setpoint - 1ºF (0.5ºC)
   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 thermostat, the Indoor Unit return air temperature sensor, or Remote Temperature Sensor configured through the Remote Controller field settings.

2.8 MUTLIZONE CENTRAL CONTROLLER

A. The Multi-Zone Central Controller (MZCC) must provide control for all outdoor and indoor units. It must be capable of controlling a maximum or 64 indoor unit groups and 128 indoor units connected to a maximum of 10 outdoor units. The MZCC, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring.

B. The controller wiring must consist of a non-polar two-wire connection. The MZCC is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s).

C. The MZCC can be used in conjunction with the individual unit, controllers, BACnet MS/TP interfaces to control the same indoor unit groups. No more than 2 remote controllers can be placed in the same group. 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.

D. The MZCC must be equipped with one RJ-45 Ethernet port to support interconnection with a network PC via the internet or Local Area Network (LAN).

E. The controller must include a BACnet gateway for interface with a BACnet BMS system.

F. Optional software functions must be available so that facility staff can securely log into each MZCC via the PC's web browser to support monitoring, scheduling, error email, and general user functions.

G. Mounting: The MZCC must be mounted on the wall or into a recessed fixing box.

H. Display Features:
   1. The MZCC must be approximately 9.07" x 5.79" in size with a backlit 5.7" LCD display.
   2. Display information must be selectable from English, French, Italian, German, or Spanish.
   3. Featured backlit LCD with contrast adjustment and auto off after 30 minutes (default) is adjustable between 1 to 60 minutes.
   4. The Controller must display On/Off, Operation Mode, Setpoint, Space Temperature, Louver Position, Fan Speed for Group/Zone.
   5. The Controller must display Date (mm/dd/yyyy or dd/mm/yyyy format selectable) and day of the week along with the time of day (12hr or 24hr display selectable).
   6. The Controller must adjust for daylight savings time (DST) automatically.
   7. Display information must be updated every 3 seconds to show the latest status of the indoor unit groups.
   8. System status icons must display On/Off (color coded), Malfunction/Error (color coded), Forced Stop, Set Schedule/Setback/Auto-changeover, Filter, and Screen Lock.
   9. The controller must display the temperature setpoint in one degree increments with a range of 600F - 900F (160C - 320C).
   10. Display of temperature setpoint information must be configurable for Fahrenheit or Celsius
   11. Display must reflect room temperature 00F - 1760F (-180C - 800C) range in one degree increment.
   12. Display of room temperature information must be configurable for Fahrenheit or Celsius
   13. The System Setting Mode must be used to configure options and display information for each Zone or Group.
   14. Zone configuration must display Setpoint Range Limitation, Setback Temperature setting, and Auto-changeover for each Zone.
   15. Indoor units must be capable of being displayed by Zone or Group.
       a. Zones configuration via the MZCC must consist of a single indoor unit group or a collection of indoor unit groups blocked together for control and monitoring purposes

b. Groups must consist of 1 to 16 indoor units daisy chained together via the remote control wiring on P1P2 of the indoor unit terminal block for control and monitoring purposes
c. Groups and Zones may be assigned names

16. Error status must be displayed in the event of system abnormality/error with one of two color coded icons placed over the indoor unit icon.
    a. Communication errors between the MZCC and the indoor units must be displayed with a blue triangle placed over the indoor unit Icon
    b. System errors between the MZCC and the indoor units must be displayed with a yellow triangle placed over the indoor unit icon
    c. Error history must be available for viewing the 10 most recent errors/abnormalities

I. Basic Operation
1. Capable of controlling Zone(s) or Group(s) of up to 64 indoor unit groups (128 indoor units).
2. Controller must control the following group operations:
    a. On/Off
    b. Operation Mode (Cool, Heat, Fan, Dry, and Auto)
    c. Independent Cooling and Heating setpoints in the occupied mode
        1) Cooling setpoint must be maintained higher than or equal to the heating setpoint
        2) Adjustable minimum setpoint differential 0 - 70F (0 - 40C) between cooling and heating setpoints
        3) Selectable single setpoint mode
    d. Independent Setup (Cooling) and Setback (Heating) setpoints in the unoccupied mode adjustable to 40 - 950F (5 - 350C)
        1) Setup and Setback setpoints must be set outside of the occupied setpoint range
        2) The recovery differential must be 40F (default) and adjustable between 2 – 100F
        3) Settings must be applied based upon the Zone configurations
    e. Fan Speed
        1) Up to 3 speeds (dependent upon indoor unit type)
    f. Airflow Direction
        1) 5 fixed positions or swing position
    g. The controller must be able to limit the user adjustable setpoint ranges individually for cooling and heating based upon the Zone configurations
    h. Remote controller permit/prohibit of On/Off, Mode, and Setpoint
    i. Lock out setting for MZCC display
    j. Indoor unit Group/Zone assignment
3. Capable of providing battery backup power for up to 2 years in total time for the clock.
    a. Settings stored in non-volatile memory

J. Programmability
1. Controller must support weekly schedule settings.
    a. Selectable weekly patterns
        1) 7-day
        2) Weekday + Weekend
        3) Weekday + Saturday + Sunday
    b. The schedule must support unit On/Off

1) Each scheduled event must specify time and target Zone or Group
2) Each scheduled event must include On/Off, Operation Mode, Occupied Cooling Setpoint, Occupied Heating Setpoint, Setup (Cooling) Setpoint, Setback (Heating) Setpoint, Remote Controller On/Off Prohibit, Remote Controller Mode Prohibit, Remote Controller Setpoint Prohibit, and Timed Override Enable
3) Independently settable Cooling and Heating setpoints when unit is On (occupied)
4) Setup (Cooling) and Setback (Heating) setpoints when unit is Off (unoccupied) by Zone
5) Time setting in 1-minute increments
6) A 2 hour override must be provided for use enabling indoor unit operation during the unoccupied period

c. 8 independent schedules configurable with up to 8 events settable for each schedule
1) Exception days must be used to override specified days on the weekly schedule based upon irregular occupied/unoccupied conditions
2) Exception days can be configured on a set date (Jan 1) or floating date (1st Monday in September)

d. A maximum of 40 exception days can be scheduled on the yearly schedule

2. Controller must support Interlock
a. Interlock feature for use with 3rd party equipment (DOAS, dampers, occupancy sensing, etc…) to automatically control groups or zones corresponding to the change of the operation states or the On/Off states of any group.
b. Requires Digital Input/Output unit or Digital Input unit
1) On/Off based monitoring and control of equipment
2) Manual or scheduled operation of equipment
3) Operation based upon interlock with VRV/VRF indoor unit group(s)
4) Monitor equipment error/alarm status
c. Controller 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 a factory trained subcontractor. The subcontractor’s installation price must be based on the systems installation requirements. The subcontractor bids with complete knowledge of the HVAC system requirements.

B. Install indoor evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure. Provide neoprene mounts for isolation.

C. Install outdoor compressor-condenser components metal waffle pad secured to steel dunnage or equipment base.

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.

END OF SECTION 23 81 29

SECTION 23 82 33 - CONVECTORS

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. Electric baseboard radiators.
2. Trench Convector

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.

B. 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.

C. Field quality-control test reports.

D. 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, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 WARRANTY

A. Manufacturer must provide defective parts warranty extending 12 months from substantial

completion.

PART 2 - PRODUCTS

2.1 ELECTRIC BASEBOARD RADIATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Indeeco
   2. Berko Electric Heating; a division of Marley Engineered Products.
   3. Chromalox; a division of Emerson Electric Company.
   4. Markel Products; a division of Marley Engineered Products.
   5. Or approved equal.

B. Description: Factory-packaged units constructed according to UL 499, UL 1030, and UL 2021.

C. Heating Elements: Stainless steel elements with aluminum fins engineered to float on high temperature nylon bushings, with high-temperature cutout and sensor running the full length of the element. Element supports shall eliminate thermal expansion noise.

D. Enclosures: Robust 22-gauge steel body with 20-gauge front panel and welded junction box, with 4H pencil hardness epoxy/polyester powder paint finish in white or almond

   1. Full-height back.
   2. End panel.
   3. Finish: Baked-enamel finish in manufacturer's standard color as selected by Commissioner.
   4. Element Brackets: Primed and painted steel to support front panel and element.

E. Unit Controls:
   1. Safeties: Linear limit, automatic reset thermal cutout.
   2. Integral disconnect switch.
   3. Integral tamperproof thermostat.
   4. Low voltage relay kit with transformer for control via building management system

2.2 TRENCH CONVECTOR

A. Basis of Design Product: Subject to compliance with requirements, provide Kampmann Model QE or comparable product by one of the following:
   1. Aermec
   2. Marley
   3. Air Fixture
   4. Or approved equal.

B. Enclosure: Galvanized sheet steel painted graphite grey on both sides with cross bracing to reinforce the floor trench fitted with sturdy adjustment feet with sound isolation to prevent sound transmission. Maximum enclosure height including adjusting feet shall not exceed 4.5 inches to fit within floor structure to avoid any significant structural reinforcement of existing floor joist.

C. Grille: Double-T profile, roll up aluminum grille, anodized, connections made of corrosion proof steel springs with spacers in a matching color, 65% free area.

D. Cover Plate: As visual protection and to protect against dirt with integral ventilation slot.

E. Electrical Heating Element: Sheathed in stainless steel tubing with aluminum-zinc fins with factory-fitted safety protective pipe for 2-stage safety chain, consisting of safety thermostat and temperature safety mechanism. Heating element factory wired into control unit and provided with overtemperature safety cutout.

F. Booster Fan: Integral grille as a safety guard for an even airflow through the heating element, providing high heat outputs with low noise emissions, robust motor design infinitely variable speed control via an external 0-10 V signal motor monitoring with internal fault processing.

G. Unit Control: Factory furnished, wall mount, 24 Volt thermostat field wired to unit controller. integral power control for the electric heating element and the electronically commutated tangential fan. The output is regulated by means of an active 0-10 V DC signal and is proportional to the control signal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 BASEBOARD RADIATOR INSTALLATION

A. Install units' level and plumb.

B. Install enclosure continuously around corners, using outside and inside corner fittings.

C. Join sections with splice plates and filler pieces to provide continuous enclosure.

D. Install access doors for access to valves.

E. Install enclosure continuously from wall to wall.

F. Terminate enclosures with manufacturer's end caps except where enclosures are indicated to extend to adjoining walls.

3.3 CONNECTIONS

A. Ground electric convection heating units according to Section 26 05 26 "Grounding and Bond-

ing 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 the following field tests and inspections and prepare test reports:
   1. Operational Test: After electrical circuitry has been energized, start units to confirm proper convection heating unit operation.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace heating units that do not pass tests and inspections and retest as specified above.

END OF SECTION 23 82 33

SECTION 23 82 39.19 – WALL AND CEILING UNITHEATERS

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. Wall Unit Heaters

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data

   1. Submit copies of manufacturer's latest published literature for materials specified herein for approval, and obtain approval before materials are delivered to the site.
   2. Data must include manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gauges and finishes of materials, and installation instructions.

B. 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.

C. 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.

D. Samples: Submit 3 samples for each type of cabinet finish furnished.

E. 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.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 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.

1.6 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. Manufacturer must provide warranty for a period of one year from substantial completion. Warranty must cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer’s written instructions for installation, operation and maintenance have been followed.

PART 2 - PRODUCTS

2.1 WALL UNIT HEATER (EH-2)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Indeeco
2. Stelpro
3. Qmark
4. Berko
5. Or Approved Equal

B. Furnish and install where indicated on plans ceiling mount air curtain heater suitable for continuous operation. Heaters must be UL listed.

C. Enclosure: The heaters must be fabricated of minimum 18-gauge steel cabinet and grille with rounded corners, epoxy-polyester powder coat finish, constructed for easy access for maintenance. Standard color must be white / soft white. Custom color as selected by Commissioner.

D. Airflow configuration: Air intake from top grille with bottom grille downward air discharge.

E. Heating Element: The heating element shall be steel finned tubular elements.

F. Fan and Motor: Propeller fan, factory lubricated motor.

G. Control: Integral disconnect switch and tamper proof built-in thermostat. Thermostat adjustment knob to be replaced with concealing plug for tamperproof construction.

H. Heaters must be designed to permit use of supply conductors with 60°C insulation.

I. Protection: Linear thermal cut-out must be factory installed to automatically shut off heater in event of overheating and reactivate heater when temperatures return to normal.

J. Mounting: Wall mount, recessed or surface mount. Provide adapter and trim kit for surface mount installation.

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 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 with other trades and Commissioner. Ensure that required clearance are maintained to combustible construction and as per manufacturer’s written instructions.
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 Electric Contractor.

2. Verify that electrical wiring installation is in accordance with manufacturer's submittal and compliance with 2014 NYC electrical Code. Do not proceed with equipment startup until wiring installation is acceptable to equipment manufacturer.

C. Adjusting and Cleaning

1. 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 39.19

CONTRACT # 4

ELECTRICAL WORK

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SECTION 26 00 13 – ELECTRICAL 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 **$5,000.00** for the **Electrical 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 (cumingtonite-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 Electrical 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 Electrical 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 then 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"	l4”	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 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = 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 Electrical 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 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 RELATED SECTIONS

A. Section 07 84 13 “Penetration Firestopping” for fire stopping at penetrations.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Product Data: For sleeve seals.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

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 water stop, 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:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.
e. 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.

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.

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 Section 07 84 13 “Penetration Firestopping” and Section 07 92 00 “Joint Sealants”.

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.

END OF SECTION 26 05 00

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SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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 building wires and cables and associated splices, connectors, and terminations for wiring systems rated 600 volts and less.

1.3 RELATED SECTIONS

A. Section 26 05 29 "Hangers and Supports for Electrical Systems".

B. Section 26 05 53 "Identification for Electrical Systems".

C. Section 28 46 00 "Fire Detection and Alarm".

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Product Data: for each type of product indicated.

1.6 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 70-2008, as amended by 2014 New York City Electrical Code and NEC 2011.

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 Part 3 "Conductor and Insulation Applications" Article 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 2014 NYC Building Code and 2014 NYC Electrical 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 must have following characteristics:

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 40 00 "Fire Detection and Alarm" for fire alarm 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 29 "Hangers and Supports for Electrical Systems."

F. Seal around cables penetrating fire-rated elements according to Section 07 84 13 “Penetration Firestopping”.

G. Identify wires and cables according to Section 26 05 53 "Identification 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. Circuitry requirements for low voltage systems must be as follows:

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 of the 2014 New York City Electrical Code and NEC 2011- 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 refer to Section 078413 - Penetration Firestopping.

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:

3. Test procedures used.
4. Test results that comply with requirements.
5. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19

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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. 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. Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables".

B. Section 26 05 33 "Raceways and Boxes for Electrical Systems".

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field Test Reports: Written reports specified in Part 3.

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, by Underwriters Laboratories, Inc.

1. Comply with UL 467.

C. Comply with NFPA 70-2008, as amended by 2014 New York City Electrical Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers

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 and Cables".

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 2014 New York City Electrical Code, 2011 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

2014 New York City Electrical Code and 2011 NEC 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 2014 New York City Electrical Code and 2011 NEC.

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 2014 NYC Electrical Code and run in intermediate metallic conduit. 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 intermediate metallic conduit and sized as per 2014 New York City Electrical 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 so as 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 2014 NYC Electrical Code and run in intermediate metallic conduit. The neutral of each transformer must be bonded to the transformer enclosure by means of an insulated conductor sized as 2014 NYC Electrical 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
* Adjust quantity (if needed) to match number of conduits in run.	

3.3 INSTALLATION

A. General: Ground electrical systems and equipment according to NFPA 70-2008, as amended by 2014 New York City Electrical Code and 2011 NEC 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 not exceed 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 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: For steel slotted support systems.

B. 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.
   4. 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 -2008.

1.6 PERFORMANCE REQUIREMENTS

A. Supports for multiple raceways must be capable of supporting combined weight of supported systems and its contents.

B. Supports must be capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Engineered support systems must be 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.

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 and scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70 - 2008. 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 - 2008.

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 New York City Electrical Code -2011:
   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 Section 09 90 00 “Painting and Coating” 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. Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related sections

1. Section 07 84 13 “Penetration Firestopping”.
2. Section 26 05 29 “Hangers and Supports for Electrical Systems”
3. Section 26 05 33.16 “Boxes for Electrical Systems”.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

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 70-2008, Article 100 and marked for intended use.

C. Comply with NFPA 70-2008, as amended by New York City Electrical Code -201.

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

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:

1. Hoffman.
2. Square D
3. The Wiremold Company
4. Or 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 70-2008.

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:

a. Thomas & Betts Corporation.
b. Walker Systems, Inc; Wiremold Company (The)
c. The Wiremold Co., Electrical Sales Division.
d. Or 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:

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. Or Approved Equal.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast Metal Outlet and Device Bopxes: 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- 2011.

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-2011.

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. See 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 or not 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. Cooling tower areas.
   c. Kitchens up to a height of 18inches (45 cm) above finished floor.
   d. 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 NFPA7-2008.

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 semirecessed 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 0533.16 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. Section Includes:

1. Wall and ceiling outlet boxes.
2. Floor boxes.
3. Pull and junction boxes.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 SUBMITTALS

A. List of box construction, size and finish indicating where each type will be used.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Conform to requirements of ANSI/NFPA 70 - 2008.

C. Furnish products listed and classified by Underwriters Laboratories, Inc.

1.6 REFERENCES

A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

C. ANSI/NEMA OS 2 – Non-metallic Outlet Boxes, Device Boxes, Covers and Box Supports.

D. ANSI/NFPA 70 -2008 - National Electrical Code.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.7 PROJECT CONDITIONS

A. Verify field measurements are as shown on Drawings.

B. Verify locations of floor boxes and outlets prior to rough-in.

C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Hazardous Location Fittings and Outlet Boxes:

1. Conform to UL Std. 886 and NYCEC.

2. Fittings must be malleable iron construction.

3. Manufacturers

a. OZ/Gedney.

b. Appleton.

c. Cooper Crouse-Hinds.

d. Or Approved Equal.

B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel. Minimum size 4 inches square for power, 4 11/16" x 4 11/16" x 2 1/8" deep for telephone and data, unless otherwise noted.

1. Manufacturers:

a. Steel City.

b. Raco.

c. Bowers,

d. Or approved equal.

2. Luminaire and equipment supporting boxes: Rated for weight of equipment supported; include 1/2-inch male fixture studs where required.

3. Concrete ceiling boxes: Concrete type, 4 inch octagonal.

C. Nonmetallic Outlet Boxes: ANSI/NEMA OS 2.

D. Cast Boxes: NEMA FB 1, Type FD , cast feralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs. Manufacturers: Leviton, Appleton, Crouse-Hinds or approved equal.

2.2 FLOOR BOXES

A. Floor Boxes: ANSI/NEMA OS 1, fully adjustable before and after concrete pour, cast metal body, complete with all necessary fittings.

1. FSR.
2. Wiremolld.
3. Hubbell.
4. Or approved equal.

B. For Pullbox or Flush Outlets:

1. Steel City 600 series.
2. Walker 889 series.
3. Hubbell B2537.
4. Or approved equal.

2.3 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.

1. Material: Cast aluminum.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

C. In-Ground Cast Metal Box for Pedestrian or Light Vehicular Traffic Areas: NEMA 250, Type 6, flanged, recessed cover box for flush mounting.

1. Material: Galvanized cast iron.
2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
3. Cover legend: Electric or as noted.
4. Manufacturers: Crouse-Hinds, Appleton, E-Abel or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Install electrical boxes as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

B. Install electrical boxes to maintain headroom and to present neat mechanical appearance.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07 84 13 “Penetration Firestopping”.

F. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.

G. Use flush mounting outlet boxes in finished areas.

H. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.

I. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

J. Use stamped steel bridges to fasten flush mounting outlet box between studs.

K. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

L. Use adjustable steel channel fasteners for hung ceiling outlet box.

M. Do not fasten boxes to ceiling support wires.

N. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.

O. Use gang box where more than one device is mounted together. Do not use sectional box.

P. Use gang box with plaster ring for single device outlets.

Q. Use cast outlet box with gasketed cover plate in exterior locations and wet locations (including under the soffits and canopies).

R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

S. Set floor boxes level to top of slab.

T. When casting floor boxes in slab each floor box must be provided with a drag wire to pull cables and provided with protective cover to prevent concrete from entering the floor box prior to concrete pour.

U. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.

1. Interior Dry Locations: Use hinged enclosure.

2. Other Locations: Use surface-mounted cast metal box.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations and sizes of required access doors with other trades.

B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

C. Coordinate mounting heights and locations of outlets mounted above counters, benches and backsplashes.

D. Position outlet boxes to locate luminaires as shown on reflected ceiling plan.

3.4 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closure in unused box openings.

END OF SECTION 26 0533.16

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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 electrical identification materials and devices required to comply with ANSI C2, NFPA 70-2008, NYC Electrical Code-2011, OSHA standards.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.4 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Comply with NFPA 70 and 2014 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.

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 thick 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 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 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 thick for signs up to 20 sq. in. and 1/8 inch 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 grommets in corners for mounting.

D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch 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.
2. Tensile Strength: 50 lb 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 wide, completely encircling conduit.

2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot 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 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 wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification 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 from the terminal and spaced 3 inches 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.

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 ½-inch high lettering on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches 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 73 – POWER SYSTEM STUDIES

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 computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals may be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and equipment evaluation reports.
3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.

    a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Coordination Study Specialist

B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in DDC General Conditions:

a. The following parts from the Protective Device Coordination Study Report:

1) One-line diagram.
2) Protective device coordination study.
3) Time-current coordination curves.

b. Power system data.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

C. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

D. Coordination Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the State of New York. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

E. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and 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.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Subject to compliance with requirements, utilize software from following software developers

1. ESA Inc.

2. Operation Technology, Inc.
3. Power Analytics, Corporation.
4. SKM Systems Analysis, Inc.
5. Approved Equal

B. Comply with IEEE 242 and IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

A. Executive Summary: Report shall include executive summary of findings.

B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Motor and generator designations and kVA ratings.
4. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Calculated asymmetrical fault currents:

1) Based on fault-point X/R ratio.
2) Based on calculated symmetrical value multiplied by 1.6.
3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.
    b. Calculated symmetrical fault-current magnitude and angle.
    c. Fault-point X/R ratio.
    d. No AC Decrement (NACD) ratio.
    e. Equivalent impedance.
    f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
    g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

F. Protective Device Coordination Study:

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

    a. Phase and Ground Relays:

        1) Device tag.
        2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
        3) Recommendations on improved relaying systems, if applicable.

    b. Circuit Breakers:

        1) Adjustable pickups and time delays (long time, short time, ground).
        2) Adjustable time-current characteristic.
        3) Adjustable instantaneous pickup.
        4) Recommendations on improved trip systems, if applicable.

    c. Fuses: Show current rating, voltage, and class.

G. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:

    a. Power utility's overcurrent protective device.

b. Low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
c. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
d. Transformer full-load current, magnetizing inrush current.
e. Ground-fault protective devices.
f. The largest feeder circuit breaker in each motor-control center and panelboard.

5. Provide adequate time margins between device characteristics such that selective operation is achieved.
6. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.3 PROTECTIVE DEVICE COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. The study shall be based on the device characteristics supplied by device manufacturer.

D. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. The calculations shall include the ac fault-current decay from induction motors. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

G. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:

1. Electric utility's supply termination point.
2. Switchgear.
3. Low-voltage switchgear.
4. Motor-control centers.
5. Standby generators and automatic transfer switches.
6. Branch circuit panelboards.

H. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3.4 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Commissioner.
2. Use characteristics submitted under the provisions of action submittals and information submittals for this Project.

B. Gather and tabulate the following input data to support coordination study. The list below is a guide.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus, three phase and line-to-ground.
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

9. Maximum demands from service meters.
10. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
11. Motor horsepower and NEMA MG 1 code letter designation.
12. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
13. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Ratings, types, and settings of utility company's overcurrent protective devices.
    c. Special overcurrent protective device settings or types stipulated by utility company.
    d. Time-current-characteristic curves of devices indicated to be coordinated.
    e. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    f. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    g. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.

3.5 FIELD ADJUSTING

A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

3.6 DEMONSTRATION

A. Engage the Coordination Study Specialist to instruct the facility’s maintenance personnel in the following:

1. Fundamentals of operating the power system in normal and emergency modes.
2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.
3. Adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 26 05 73

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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 facility’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 facility’s maintenance personnel to adjust, operate, and maintain specific equipment.

6. Instruct the facility'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 contractors 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 main distribution panel, panel boards, 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 facility'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, 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. 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 FACILITY’S 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. Related Sections:
   1. Section 26 27 26 “Wiring Devices” for wiring.

C. The networked lighting control system must meet all the characteristics and performance requirements specified herein.

D. 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 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. 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 five-year warranty on all hardware devices supplied and installed. Warranty coverage must begin form 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: subject to compliance with requirements, provide products by one of the following:

1. Acuity Brands Lighting, Inc.
2. Lutron
3. Watt Stopper
4. Or 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 70-2008.

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 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 is not 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 is not 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 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 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 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 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 Microsoft Internet Explorer, Apple Safari, Google Chrome, Mozilla Firefox or approved equal.
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. A 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 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 EldoLED LEDcode 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 will 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) are not 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 will 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. 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 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.
4. Devices with mechanical push-buttons must provide tactile user feedback.
5. 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. 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 Commissioner IT Network Infrastructure

1. Coordinate with the Commissioner to secure all required network connections to the building's 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 building's 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. Comissioner Instruction

1. Provisions for onsite instruction must be included in submittal package.

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SECTION 260943 - NETWORK LIGHTING 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. Network lighting control system and associated components:
    a. Power interfaces.
    b. Lighting control modules and/or nodes.
    c. Lighting management hubs.
    d. Lighting management system software.
    e. Control stations.
    f. Low-voltage control interfaces.
    g. Wireless sensors.

B. Related sections

1. Section 265100 Lighting for architectural & house lights.

C. Reference standards

1. 47 CFR 15 - Radio Frequency Devices current edition.
2. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments 2019.
3. IEC 60929 - AC and/or DC-Supplied Electronic Control Gear for Tubular Fluorescent Lamps - Performance Requirements 2015.
4. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test 2008.
5. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).
6. ISO 9001 - Quality management systems -- Requirements 2015.
7. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
8. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.

9. NEMA SSL 7A - Phase-Cut Dimming for Solid State Lighting: Basic Compatibility 2015 (Reaffirmed 2021).
10. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2020).
11. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction (Code Enforcement), Including All Applicable Amendments and Supplements.
12. UL 508 - Industrial Control Equipment Current Edition, Including All Revisions.
13. UL 924 - Emergency Lighting and Power Equipment Current Edition, Including All Revisions.
14. UL 1472 - Solid-State Dimming Controls Current Edition, Including All Revisions.
15. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces Current Edition, Including All Revisions.
16. New York City Electrical Code.
17. New York City Building Code (and Reference Standards).

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. The Contractor shall coordinate all aspects of the network lighting control package and installation with the drawings and details of the Architectural, Structural, Electrical, Mechanical, and all other related trades.

B. No variation from the general arrangement and details indicated on the drawings shall be made in the submittal unless required to suit the actual conditions on the premises, and then only with the written approval of the Commissioner.

C. Submittal document(s) for the network lighting control package shall be received no later than sixty days after award of Contract.

D. Review of shop drawings does not waive contract requirements.

E. Provide manufacturer’s product data sheets for all components within the network lighting control package.

1.5 SHOP DRAWINGS

A. Prior to fabrication of the equipment furnished as a part of work in this section, submit shop drawings and product data as required. Do not fabricate without approvals of the submittals. Make modifications to equipment in accordance with the comments concerning submittals.

B. Narrative descriptions, cut sheets and verbatim copies of catalogue numbers, and submittals that do not include manufacturer’s current submittal sheets are not acceptable for review.

C. Data Sheets lacking sufficient detail to indicate compliance with contract documents will not be acceptable.

D. Shop drawings must be provided for all fixture components.

E. Shop drawings should include:

1. All mechanical and electrical construction details for all components of the system.
2. Mounting details, weights, requirements for clearances and ventilation and provisions for the work of other trades.
3. Manufacturer's catalog numbers and a complete bill of material.
4. A schedule indicating the actual loads per circuit, which circuits are on which control zones (channels), and the corresponding circuit number per the electrical drawings.
5. An interconnection diagram showing a detail of each control, the dimmer cabinets, which zones (channels) are operated by each control, and the interconnecting wiring between controls and the dimmer cabinets. Provide one diagram for each dimmer cabinet location. Block diagrams involving cross referencing to separate catalog cut sheets will not be acceptable.
6. Schedule of control finishes.
7. For any non-standard controls, controls requiring engraving or custom graphics, or any other controls as requested by the designer, provide a drawing detailing the control in a scale not less than one-half actual size.
8. Submit catalog literature with performance data that verify compliance to these specifications.
9. Provide any additional information or demonstrations as required by the Commissioner to demonstrate conformance with Part 2 of this section. All demonstrations are to be at a location, time and in a manner chosen by the Commissioner.
10. Provide, if requested, a copy of the NRTA file card showing listing of all components of the system, and the system as a complete assembly.

1.6 SAMPLES:

A. Provide if requested, at no charge, actual samples of any system component for examination.

B. Shipping: The samples shall be shipped, prepaid by Contractor, 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.

1.7 CLOSE OUT SUBMITTALS

A. The Contractor shall be responsible for obtaining from his 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.

1.8 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. The Installer shall be a firm having trained personnel who have been in the business of installing specialty lighting for not less than three (3) years and shall provide a full-time field superintendent who shall be a representative of the installer during the installation and testing.

C. The entire system shall be listed by a Nationally Recognized Testing Agency (NRTA) and shall bear an approval label on each panel.

D. Each dimming module shall be specifically listed by the NRTA for the control of its required load (ie: 0-10V, DMX).

E. The dimming system shall be designed to and meet the requirements of

1. Military Standard 217F
2. Military Standard 105D or equivalent.
3. Requirements of NFPA 70.

F. Dimming Module main semiconductors shall be 100 percent tested at a temperature of 100 degrees C with rated voltage applied for 48 hours. Semiconductors showing deterioration during this test shall not be used in the system.

G. The dimming system shall be completely assembled and tested by the manufacturer as a system for 5 hours at full load before shipment.

H. Finished system shall be fully tested for proper operation of all control functions per the approved shop drawings

I. Maintain at project site one copy of each referenced document that prescribes execution requirements.

J. Manufacturer Qualifications:

1. Company with not less than three (3) years of experience manufacturing lighting control systems of similar complexity to specified system.
2. Registered to ISO 9001, including in-house engineering for product design activities.
3. Qualified to supply specified products.

1.9 WARRANTY

A. Manufacturer shall provide two (2) year warranty and service on the system, providing 100% replacement parts & 100% labor coverage with a first-available response time.

B. Warranty service shall begin from the date of system Substantial Completion.

C. Warranty work to be performed by a factory-based engineer.

D. Manufacturer to have a published telephone number staffed with factory engineers for questions and troubleshooting assistance.

E. Warranties shall be provided in an acceptable form and shall be signed and notarized by a person or persons authorized to execute such a document on behalf of the company.

1.10 DESCRIPTION OF WORK

A. Scope

1. The extent of lighting control work includes, but is not limited to, the furnishing and installation of all lighting control components into a complete and working lighting control system as specified in this section, on the drawings, and as required by job conditions. System components may include, but are not limited to:

a. Control Stations, including wall mounted low voltage controls, wireless remote controls.

b. Dimmer Cabinets consisting of factory preassembled and prewired dimmer cabinets containing dimmer modules, circuit breakers, emergency transfer relays and related equipment.

c. Central System Interface for interconnection of control stations and dimmer cabinets via low voltage wiring.

d. Portable and/or permanently installed terminals for system programming.

e. Time Clock (s) for automatic operation of the lighting control system.

PART 2 – PRODUCTS

2.1 GENERAL

A. Fabricate lighting control system using the approved manufacturer's standard design, materials and construction, in accordance with his approved published product information and with approved submittals.

B. All major system components are to be manufactured and warranted by one company.

C. All equipment supplied shall be new and of the manufacturer's latest published design.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Lutron Electronics Company, Inc. with Ketra

2. Electronic Theater Controls, Inc. with dynamic color tuning lamps
3. Crestron Electronics, Inc. with dynamic color tuning lamps
4. or approved equal.

2.3 NETWORK LIGHTING CONTROL SYSTEM - GENERAL REQUIREMENTS

A. Sensor Layout and Tuning: Include as part of base bid additional costs for Lighting Control Manufacturer's Sensor Layout and Tuning service:

1. Lighting Control Manufacturer to provide and take full responsibility for wired or wireless sensor layout and performance for sensors.
2. Lighting Control Manufacturer to analyze reflected ceiling plans, via supplied electronic AutoCAD format, and design detailed sensor layout that provides adequate occupancy sensor coverage and ensures occupancy and daylight sensor performance per agreed upon sequence of operations. Contractor to utilize layouts for sensor placement.
3. During startup, Lighting Control Manufacturer to direct Contractor regarding sensor relocation, as required, should conditions require deviation from locations specified in drawings.
4. Lighting Control Manufacturer to provide up to two additional post-startup on-site service visits, within one calendar year from Date of Substantial Completion to fine-tune sensor calibration per agreed upon sequence of operations.

B. Provide products listed, classified, and labeled by an NRTA as suitable for purpose indicated.

C. Unless specifically indicated to be excluded, provide required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for complete operating system that provides control intent indicated.

D. Design lighting control equipment for 10-year operational life while operating continually at any temperature in ambient temperature range of 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C) and 90 percent non-condensing relative humidity.

E. Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.

F. Dimming and Switching/Relay Equipment:

1. Designed so that electrolytic capacitors operate at least 36 degrees F (20 degrees C) below capacitor's maximum temperature rating when device is under fully loaded conditions at maximum rated temperature.
2. Inrush Tolerance:
   a. Utilize load-handling thyristors (SCRs and triacs), field effect transistors (FETs) and isolated gate bipolar transistors (IGBTs) with maximum current rating at least two times rated operating current of dimmer/relay.

b. Capable of withstanding repetitive inrush current of 50 times operating current without impacting lifetime of dimmer/relay.

3. Surge Tolerance: Designed and tested to withstand surges of 6,000 V, 200 amps according to IEEE C62.41.2 without impairment to performance.

4. Power Failure Recovery: When power is interrupted and subsequently restored, within 3 seconds lights to automatically return to same levels, e.g., dimmed setting, full on, or full off, as prior to power interruption.

5. Dimming Requirements:

a. Line Noise Tolerance: Provide real-time cycle-by-cycle compensation for incoming line voltage variations including changes in RMS voltage (plus or minus 2 percent change in RMS voltage per cycle), frequency shifts (plus or minus 2 Hz change in frequency per second), dynamic harmonics, and line noise.

b. Systems not providing integral cycle-by-cycle compensation to include external power conditioning equipment as part of dimming system.

c. Incorporate electronic "soft-start" default at initial turn-on that smoothly ramps lights up to appropriate levels within 0.5 seconds.

d. Utilize air gap off to disconnect load from line supply.

e. Control light sources in smooth and continuous manner. Dimmers with visible steps are not acceptable.

f. Load Types:

1) Assign load type to each dimmer that will provide proper dimming curve for specific light source to be controlled.

2) Provide capability of being field-configured to have load types assigned per circuit.

g. Minimum and Maximum Light Levels: User adjustable on circuit-by-circuit basis.

6. Switching Requirements:

a. Rated Life of Relays: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.

b. Switch load in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.

c. Provide output fully rated for continuous duty for inductive, capacitive, and resistive loads.

G. Device Finishes:

1. Standard Colors: Comply with NEMA WD 1 where applicable.

2. Color Variation in Same Product Family: Maximum delta E of 1, CIE L*a*b color units.

3. Visible Parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.

2.4 POWER INTERFACES

A. Provide power interfaces as indicated or as required to control loads as indicated.

B. General Requirements:

1. Phase independent of control input.
2. Rated for use in air-handling spaces as defined in UL 2043.
3. Utilize air gap off to disconnect load from line supply.
4. Diagnostics and Service: Replacing power interface does not require reprogramming of system or processor.

2.5 LIGHTING CONTROL MODULES

A. Module to integrate wired and wireless sensors and light controls with digital ballasts, 1-10V loads and switching loads.

B. Provide lighting control modules as indicated or as required to control loads as indicated.

C. General Requirements:

1. Listed to UL 508 as industrial control equipment.
2. Delivered and installed as listed factory-assembled panel.
3. Passively cooled via free-convection, unaided by fans or other means.
4. Mounting: Surface.
5. Connection without interface to wired:
   a. Occupancy sensors.
   b. Daylight sensors.
6. Connects to lighting management hub via RS485.
7. LED status indicators confirm communication with occupancy sensors and daylight sensors.
8. Contact Closure Input (select models):
   a. Directly accept contact closure input from dry contact closure or solid-state output without interface to:
      1) Activate scenes.
         a) Scene activation from momentary or maintained closure.
      2) Enable or disable after hours.
         a) Automatic sweep to user-specified level after user-specified time has elapsed.
         b) System provides occupants visual warning prior to sweeping lights to user-specified level.
         c) Occupant can reset timeout by interacting with lighting system.

3) Activate or deactivate demand response (load shed).

a) Load shed event reduces lighting load by user-specified amount.

9. Emergency Contact Closure Input:

a. Turn all zones to full output during emergency state via direct contact closure input from UL 924 listed emergency lighting interface, security system or fire alarm system.

b. Allow configurable zone response during emergency state.

c. Disable control operation until emergency signal is cleared.

10. Supplies power for control link for keypads and control interfaces (select models).

11. Distributes sensor data among multiple lighting control modules.

12. Capable of being controlled via wireless sensors and controls.

D. Ethernet-based dimming products:

1. Components:

a. Provide interface to ethernet-based dimming protocols.

E. Phase Adaptive Lighting Control Modules:

1. Components:

a. Provide leading-edge or trailing-edge dimming; automatic or manual configuration.

b. Output Zones: One load type per zone.

c. Manual Mode Operation: Provide buttons to turn loads on/off or dim loads up/down for each zone.

d. Provide cycle-by-cycle compensation for incoming line voltage variations, including changes in voltage, frequency shifts, harmonics, and line noise; accommodate up to plus/minus two percent change in frequency per second.

e. Comply with NEMA SSL 7A.

f. Capable of withstanding high-inrush LEDs, bulb blowouts, and direct shorts with RTISS-ICM technology.

F. 0-10V Lighting Control Modules:

1. Components:

a. Coordination Between Low Voltage Dimming Module and Line Voltage Relay: Capable of being electronically linked to single zone.

b. Single low voltage dimming module; capable of controlling the following light sources:

1) 0-10V analog voltage signal.

2) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.

3) Sink current per IEC 60929.

2. Switching:

a. Rated Life of Relay: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.

b. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.

c. Fully rated output continuous duty for inductive, capacitive, and resistive loads.

d. Module to integrate up to four individually controlled zones.

e. Utilize air gap off, activated when user selects "off" at any control to disconnect load from line supply.

2.6 LIGHTING MANAGEMENT HUBS

A. Supports connection to wired devices via Links; supports connection to processors, Type X wireless gateways via system Ethernet link.

B. Supports communication with Type X wireless devices, including intelligent light sources, via Type X wireless Gateways.

C. Supports internet connection for automated firmware updates and remote access, diagnostics, and service.

D. Provided in pre-assembled NEMA listed enclosure with terminal blocks listed for field wiring.

E. Connects to controls via RS485.

F. Integrates control station devices, shades, and external inputs into single customizable lighting control system with:

1. Multiple Failsafe Mechanisms:

a. Power failure detection via emergency lighting interface.

b. Protection: Lights go to full on if ballast wires are shorted.

c. Distributed architecture provides fault containment. Single hub failure or loss of power does not compromise lights and shades connected to other lighting management hubs.

2. Manual overrides.

3. Automatic control.

G. Furnished with astronomical time clock.

H. Maintains backup of programming in non-volatile memory capable of lasting more than ten years without power.

2.7 LIGHTING MANAGEMENT SYSTEM SOFTWARE

A. Provide system software and hardware that is designed, tested, manufactured, and warranted by single manufacturer.

B. Configuration Setup Software:

1. Suitable to make system programming and configuration changes.

2. Windows-based, capable of running on either central server or remote client over TCP/IP connection.
3. Back-Up Project Database: Allows user to back up project database that holds configuration information for system, including keypad programming, area scenes, daylighting, occupancy programming, emergency levels, night lights, and time clock.
4. Publish Project Database: Allows user to send new project database to processors and devices. Project database holds configuration information for system, including keypad programming, area scenes, daylighting, occupancy programming, emergency levels, night lights, and time clock.
5. Allows manufacturer (either remotely or with on-site service call) or end-user (with training) to:
    a. Capture system design:
        1) Geographical layout.
        2) Load schedule zoning.
        3) Equipment schedule.
        4) Equipment assignment to lighting management hubs.
        5) Daylighting design.
    b. Define configuration for the following in each area:
        1) Lighting scenes.
        2) Control station devices.
        3) Interface and integration equipment.
        4) Occupancy/after hours.
        5) Partitioning.
        6) Daylighting.
        7) Emergency lighting.
        8) Night lights.
    c. Startup:
        1) Addressing.
        2) Daylighting.
        3) Provide customized conditional programming.

C. API Integration:

1. Support communication, without requiring interface, between lighting control system and third-party system via RESTful API.
2. API Integration Capabilities:
    a. Discovery:

1) Areas: Area and scene names.
2) Zones: Zone names, minimum and maximum light levels.

b. Monitoring:
1) Area Information:
a) Occupancy status.
b) Occupancy enabled.
c) Lighting zone status.
d) Active scene.
e) Instantaneous and maximum lighting power.
2) Zone Information:
a) Light intensity.
b) Switch level.
c) Contact closure output status.
d) Correlated color temperature, where controllable.

c. Control:
1) Lighting Control:
a) Activate scene.
b) Set lighting zone level and correlated color temperature, where controllable.

D. Mobile Application:
1. Supports on-site and remote programming and control of multiple systems from iOS mobile device.
2. Supports 10,000 user accounts and 20 concurrent users.
3. Monitoring:
a. Current status of areas, scenes, and zones.
b. Intensity, color, saturated color, and vibrancy.
4. Control:
a. Lighting Control:
1) Modify lighting zone levels and activate scenes reflected in space in real time.
2) Make and save adjustments to scenes.
3) Dynamic color tunable lights:
a) Control intensity, correlated color temperature, saturated color, and vibrancy reflected in space in real time.
b) Save adjustments to intensity, correlated color temperature, saturated color, and vibrancy to scenes.

b. Shade Group Control:

1) Modify shade group levels and activate shade group presets reflected in space in real time.

2) Make and save adjustments to shade presets.

c. Make and save adjustments to timeclock events.

2.8 CONTROL STATIONS

A. Provide control stations with configuration as indicated or as required to control loads as indicated.

B. Wired Control Stations:

1. General Requirements:

a. Power: Class 2 (low voltage).

b. UL listed.

c. Provide faceplates with concealed mounting hardware.

d. Borders, logos, and graduations to use laser engraving or silk-screened graphic process that chemically bonds graphics to faceplate, resistant to removal by scratching and cleaning.

e. Finish: As specified for wall controls in "Device Finishes" under network lighting control system - general requirements Article 2.3 above.

2. Multi-Scene Wired Control:

a. General Requirements:

1) Allows control of any devices part of lighting control system.

2) Allows for easy reprogramming without replacing unit.

3) Communications: Utilize RS485 wiring for low-voltage communications link.

4) Engrave keypads with button, zone, and scene descriptions as indicated on drawings.

5) Software Configuration:

a) Customizable control station device button functionality:

i) Buttons can be programmed to perform single defined action.

ii) Buttons can be programmed to perform defined action on press and defined action on release.

iii) Buttons can be programmed using conditional logic off of state variable such as time of day or partition status.

iv) Buttons can be programmed to perform automatic sequence of defined actions.

v) Capable of deactivating select keypads to prevent accidental changes to light levels.

vi) Buttons can be programmed for raise/lower of defined loads.

vii) Buttons can be programmed to toggle defined set of loads on/off.

6) Status LEDs:

a) Upon button press, LEDs to immediately illuminate.

b) LEDs to reflect true system status. LEDs to remain illuminated if button press was properly processed or LEDs to turn off if button press was not processed.

c) Support logic that defines when LED is illuminated:

i) Scene logic (logic is true when all zones are at defined levels).

ii) Room logic (logic is true when at least one zone is on).

iii) Pathway logic (logic is true when at least one zone is on).

iv) Last scene (logic is true when spaces are in defined scenes).

b. Wired Keypads;

1) Style: Architectural Non-Insert Style.

2) Mounting: Wallbox or low-voltage mounting bracket; provide wall plates with concealed mounting hardware.

3) Button/Engraving Backlighting:

a) Utilize backlighting for buttons and associated engraving to provide readability under all light conditions.

b) Backlight intensity adjustable via programming software.

4) Design keypads to allow field customization of button color, configuration, and engraving using field-changeable replacement kits.

5) Contact Closure Interface: Provide two contact closure inputs on back of unit which provide independent functions from front buttons; accepts both momentary and maintained contact closures.

6) Terminal block inputs to be over-voltage and miswire-protected against reversals and shorts.

3. Wired Keyswitch:

a. Product:

1) Keyswitch dual-ganged with multi-scene control station.

b. Configuration:

1) Allows control of any devices part of lighting control system.

2) Communications: Utilize RS485 wiring for low-voltage communications link.

3) Functionality:

a) Allows for easy reprogramming without replacing unit.

b) Requires key insertion to activate actions.

c. Engrave keypads with button, zone, and scene descriptions as indicated on drawings.

d. Software Configuration:

1) Customizable control station device button functionality:

a) Key positions can be programmed to perform single defined action.

b) Key positions can be programmed using conditional logic off of state variable such as time of day or partition status.

C. Wireless (Radio Frequency) Controls:

1. Basis of Design

a. Products:

1) Multi-scene and/or multi-button controls with Raise/Lower

2. Communicates via radio frequency to compatible dimmers, switches, and plug-in modules.

3. Does not require external power packs, power or communication wiring.

4. Allows for easy reprogramming without replacing unit.

5. Button Programming:

a. Single action.

b. Toggle action.

6. Includes LED to indicate button press or programming mode status.

7. Mounting:

a. Capable of being mounted with table stand or directly to wall under faceplate.

b. Faceplates: Provide concealed mounting hardware.

8. Power: Battery-operated with minimum ten-year battery life.

9. Finish: As specified for wall controls in "Device Finishes" under network lighting control system - general requirements Article 2.3 above.

2.9 LOW-VOLTAGE CONTROL INTERFACES

A. Provide low-voltage control interfaces as indicated or as required to control loads as indicated.

B. UL listed.

C. Sensor Modules:

1. Products:

a. Sensor module with both wired and wireless inputs.

2. Connects to lighting management hub via RS485.

3. Wired Modules:

a. Provide wired inputs for:

1) Occupancy sensors.
2) Daylight sensors.
3) Wired wall stations.

4. Wireless Modules:
   a. Provide wireless communication inputs for:
      1) Occupancy sensors.
      2) Daylight sensors.
      3) Manual controls.
   b. RF Range: 30 feet (9 m) between sensor module and compatible RF transmitting devices.
   c. RF Frequency: 434 MHz; operates in FCC governed frequency spectrum for periodic operation; continuous transmission spectrum is not permitted.
5. Communicate sensor information to wired low-voltage digital link for use by compatible devices.

D. Wireless Gateway:
1. Product:
   a. Gateway with radio frequency (RF) connection to control system, wired and wireless.
   b. Connects to lighting management hub via system Ethernet link; powered by Ethernet range extender.
   c. Enables lighting control system to communicate with wireless devices, including intelligent light sources.
   d. RF Range: Maximum range of 71 feet (22 m) between wireless gateway and compatible wireless devices on same floor; maximum of 25 feet (7.6 m) between each wireless device and at least two other wireless devices.

2.10 WIRELESS SENSORS

A. General Requirements:
1. Operational life of 10 years without need to replace batteries when installed per manufacturer's instructions.
2. Communicates directly to compatible RF receiving devices through use of radio frequency communications link.
3. Does not require external power packs, power wiring, or communication wiring.
4. Capable of being placed in test mode to verify correct operation from face of unit.
5. RF Range: 30 feet (9 m) between sensor and compatible RF receiving device(s).

6. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class B application.

B. Wireless Occupancy/Vacancy Sensors:

1. General Requirements:

a. Provides clearly visible method of indication to verify that motion is being detected during testing and that unit is communicating to compatible RF receiving devices.

b. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.

c. Sensing Mechanism: Passive infrared coupled with technology for sensing fine motions. Signal processing technology detects fine-motion passive infrared (PIR) signals without need to change sensor's sensitivity threshold.

d. Provide optional, readily accessible, user-adjustable controls for timeout, automatic/manual-on, and sensitivity.

e. Turns off lighting after reasonable and adjustable time delay once last person to occupy space vacates room or area. Provide adjustable timeout settings of 1, 5, 15, and 30 minutes.

f. Color: White, to be verified by Commissioner.

g. Provide necessary mounting hardware and instructions for both temporary and permanent mounting.

h. Provide temporary mounting means to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method to be designed for easy, damage-free removal.

i. Sensor lens to illuminate during test mode when motion is detected to allow installer to verify coverage prior to permanent mounting.

j. Ceiling-Mounted Sensors:

1) Provide customizable mask to block off unwanted viewing areas.

2. Wireless Combination Occupancy/Vacancy Sensors:

a. Ceiling-Mounted Sensors: Programmable to operate as occupancy sensor (automatic-on and automatic-off), occupancy sensor with low light feature (automatic-on when less than one footcandle of ambient light available and automatic-off), or vacancy sensor (manual-on and automatic-off).

b. Coverage:

1) Ceiling-Mounted Occupancy/Vacancy Sensor: Coverage from 324 square feet (30.2 sq m) to 676 square feet (62.4 sq m) depending on ceiling height from 8 to 12 feet (2.4 to 3.7 m); 360 degree field of view.

2.11 ACCESSORIES

A. Emergency Lighting Interface:

1. Components:
    a. Provides total system listing to UL 924 when used with lighting control system.
    b. Senses all three phases of building power.
    c. Provides output to power panels or digital ballast interfaces if power on any phase fails and sends all lights controlled by these devices to emergency light level setting. Lights to return to their previous intensities when normal power is restored.
    d. Accepts contact closure input from fire alarm control panel.

B. Provide power supplies as indicated or as required to power system devices and accessories.

1. Components:
    a. Power supply for keypads and accessories (not for shades/window treatments), and for providing additional low voltage power to communication link.

2.12 SOURCE QUALITY CONTROL

A. Factory Testing:

1. Perform full-function factory testing on completed assemblies. Statistical sampling is not acceptable.

2. Perform factory audit burn-in of dimming assemblies and panels at 104 degrees F (40 degrees C) at full load for two hours.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that ratings and configurations of system components are consistent with indicated requirements.

C. Verify that mounting surfaces are ready to receive system components.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.3 INSTALLATION

A. Perform work in accordance with NECA 1 and, where applicable, NECA 130, except for mounting heights specified in those standards.

B. Install products in accordance with manufacturer's instructions.

C. Define each dimmer/relay load type, assign each load to zone, and set control functions.

D. Sensor Locations:

1. Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Article 2.3 under "network lighting control system - general requirements", locate sensors in accordance with layout provided by Lighting Control Manufacturer. Lighting Control Manufacturer may direct Contractor regarding sensor relocation should conditions require deviation from locations indicated. Where Lighting Control Manufacturer Sensor Layout and Tuning service is not specified, locate sensors in accordance with drawings.
2. Sensor locations indicated are diagrammatic. Within design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage, in accordance with manufacturer's recommendations.

E. Identify system components.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Startup Services:

1. Manufacturer's authorized Service Representative to conduct minimum of two site visits to ensure proper system installation and operation.
2. Conduct Pre-Installation visit to review requirements with installer.
3. Conduct site visit upon completion of lighting control system to perform system startup and verify proper operation:
    a. Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Article 2.3 under "network lighting control system - general requirements", authorized Service Representative to verify sensor locations, in accordance with layout provided by Lighting Control Manufacturer; Lighting Control Manufacturer may direct Contractor regarding sensor relocation should conditions require deviation from locations indicated.
    b. Verify connection of power wiring and load circuits.
    c. Verify connection and location of controls.
    d. Energize lighting management hubs and download system data program.
    e. Address devices.
    f. Verify proper connection of panel links (low-voltage/data) and address panel.
    g. Verify system operation control by control.
    h. Verify proper operation of manufacturer's interfacing equipment.
    i. Configure initial groupings of ballasts/drivers for wall controls, daylight sensors and occupancy sensors.
    j. Provide initial rough calibration of sensors; fine-tuning of sensors is responsibility of Contractor unless provided by Lighting Control Manufacturer as part of Sensor Layout and Tuning service where specified in Article 2.3 under "network lighting control system - general requirements".
    k. Instruct the facility’s maintenance personnel on system capabilities, operation, and maintenance.

l. Obtain sign-off on system functions.

4. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.5 ADJUSTING

A. On-Site Scene and Level Tuning: Include costs for Lighting Control Manufacturer to visit site to conduct meeting with Commissioner to make required lighting adjustments to the system for conformance with original design intent for (1) working-day, after-hours.

B. Sensor Fine-Tuning: Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Article 2.3 under "network lighting control system - general requirements", Lighting Control Manufacturer to provide up to two additional post-startup on-site service visits for fine-tuning of sensor calibration. Where Lighting Control Manufacturer Sensor Layout and Tuning service is not specified, Contractor to provide fine-tuning of sensor calibration.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 PROTECTION

A. Protect installed products from subsequent construction operations.

3.8 DIMMING SCHEDULE

CONTROL GROUP: Stairs								
Stairs A & B controlled by bi-level occupancy sensors. Refer to one-line diagram								
Occupancy/vacancy sensors to be finished grey in factory, specified by Commissioner								
CONTROL GROUP: Restrooms								
Occupancy/vacancy sensors to be finished grey in factory, specified by Commissioner								
Non-dim vanity light separately controlled from dimmable ambient light (accentlight or covelight)								
CONTROL GROUP: Exterior								
Exterior: preset scenes with timeclock cues								
EX-1	TXA-2	22	ln.ft.	2 W	0.044 Kw	0-10V		surface mounted linear LED
EX-3	TXA-2	22	ln.ft.	2 W	0.044 Kw	0-10V		surface mounted linear LED
Exterior: preset scenes with timeclock cues with additional override off switch in Stairwell								
EX-2	TXD	2	ea	9 W	0.017 Kw	non-dim		LED sconce
EX-4	TXD	1	ea	9 W	0.009 Kw	non-dim		LED sconce
				Total	0.114 Kw			

CONTROL GROUP: Cellar								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Corridor: programmed scenes with timeclock cues, tied to OS/VS								
C-1	TK-1	3	ea	24 W	0.072 Kw	0-10V		surface mount LED adj cyl.
	TK-2	4	ea	17 W	0.068 Kw	0-10V		surface mount LED adj cyl.
C-2	TK-2	2	ea	17 W	0.034 Kw	0-10V		surface mount LED adj cyl.
Dressing Room: (1) dimmer and (1) switch at mirror, linked to OS as per EE								
CD-1	TE	9	ln.ft.	12 W	0.108 Kw	non-dim		LED retrofit vanity mirror light
	TF	1	ea	9 W	0.009 Kw	non-dim		LED sconce (indicator light)
CD-2	TA-1	4	ea	21 W	0.084 Kw	0-10V		LED accentlight
CD-3	TS	5	ea	8 W	0.040 Kw	non-dim		surface mount LED sconce
				Total	0.415 Kw			
CONTROL GROUP: Ground Floor								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Lobby vestibule: 2-gang control station with 3-button with raise/lower engraved multi-scene station and keyswitch CONTROLS ALL LOBBY ELEVATOR VESTIBULES (LEVEL 1, 1M, 2, 3 & 4)								
G-1	TZ	3	0	24 W	0.072 Kw	0-10V	Y	pendant LED wallwash cylinder
G-2	TT	12	ea	9 W	0.102 Kw	0-10V	Y	LED decorative pendant
				Total	0.174 Kw			
Performance Space: ETC control system								
G-3	TZ	6	0	24 W	0.144 Kw	0-10V		pendant LED wallwash cylinder
G-4	TZ	6	0	24 W	0.144 Kw	0-10V		pendant LED wallwash cylinder
G-5	TY	6	0	24 W	0.144 Kw	0-10V		pendant LED wallwash accent
G-6	TM	2	ea	13 W	0.025 Kw	0-10V		surface mount LED retrofit lin.
G-7	TU	2	ea	8 W	0.015 Kw	MLV		Designated LED sconce
				Total	0.472 Kw			

CONTROL GROUP: Mezzanine								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Controlled by Ground Floor lobby vestibule station								
M-2	TA-2	2	ea	21 W	0.042 Kw	0-10V	Y	LED accentlight
				Total	0.042 Kw			
Performance Space: theatrical control system with dynamic color tuning wireless controls								
M-1	TC	8	ea	16 W	0.128 Kw	0-10V	Y	LED wallwash
M-3	SPARE							VOID
M-4	TJ	5	ea	2 W	0.008 Kw	0-10V		LED steplight with blue-gel
M-5	TA-2	2	ea	21 W	0.042 Kw	0-10V		LED accentlight
M-6	TM-1	18	ea	13 W	0.229 Kw	0-10V		surface mount LED retrofit lin.
M-7	TD	19	ea	18 W	0.342 Kw	wireless		LED retrofit c-clamp wallwash
M-8	TA-2	2	ea	21 W	0.042 Kw	0-10V		LED accentlight
				Total	0.790 Kw			
CONTROL GROUP: Second Floor								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Controlled by Ground Floor lobby vestibule station								
S-1	TC	3	ea	16 W	0.048 Kw	0-10V	Y	LED wallwash
S-2	TA-2	2	ea	21 W	0.042 Kw	0-10V	Y	LED accentlight
Flex Space: (2) 5-button with raise/lower engraved multi-scene station (north and south ends of space). Stations may control zones S-4 & S-5 separately and together.								
S-3	TA-2	4	ea	21 W	0.084 Kw	0-10V		LED accentlight
S-4	TM-2	6	ea	13 W	0.076 Kw	0-10V		surface mount LED retrofit lin.
S-5	TM-2	6	ea	13 W	0.076 Kw	0-10V		surface mount LED retrofit lin.
S-6	TM	18	ea	13 W	0.229 Kw	0-10V		surface mount LED retrofit lin.
Local Dimmer								
ALCOVE	TM-5	1	ea	13 W	0.013 Kw	non-dim		surface mount LED retrofit lin.
				Total	0.568 Kw			

CONTROL GROUP: Third Floor								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Controlled by Ground Floor lobby vestibule station								
T-1	TC	9	ea	16 W	0.144 Kw	0-10V	Y	LED wallwash
T-2	TA-2	2	ea	21 W	0.042 Kw	0-10V		LED accentlight
T-3	TA-1	4	ea	21 W	0.084 Kw	0-10V		LED accentlight
Admin: 3-button with raise/lower engraved multi-scene station								
T-5	TA-1	3	ea	21 W	0.063 Kw	0-10V		LED accentlight
T-6	TG	3	ea	35 W	0.105 Kw	0-10V		surface mount LED round
T-7	TW	3	ln.ft.	4 W	0.011 Kw	non-dim		surface mount LED tasklight
Dressing Room: 3-button with raise/lower engraved multi-scene station								
T-4	TF	1	ea	9 W	0.009 Kw	non-dim		LED sconce (indicator light)
	TS	4	ea	8 W	0.032 Kw	non-dim		surface mount LED sconce
T-8	TA-2	4	ea	21 W	0.084 Kw	0-10V		LED accentlight
Office: 3-button with raise/lower engraved multi-scene station with OS/VS by Commissioner								
T-11	TG	1	ea	35 W	0.035 Kw	0-10V		surface mount LED round
Private Dressing/Toilet: 3-button with raise/lower engraved multi-scene station & OS/VS by Commissioner								
T-9	TE	4	ln.ft.	12 W	0.048 Kw	non-dim		LED retrofit vanity mirror light
	TF	1	ea	9 W	0.009 Kw	non-dim		LED sconce (indicator light)
T-10	TA-1	1	ea	21 W	0.021 Kw	0-10V		LED accent light
				Total	0.686 Kw			

CONTROL GROUP: Fourth Floor								
Control Zone	Fixture Type	Quantity		Load		Dimmer Type (source)	Daylight Sensor	Zone Description
				unit (lamp wattage only)	total zone (kWatts)			
Controlled by Ground Floor lobby vestibule station								
F-1	TC	4	ea	16 W	0.064 Kw	0-10V	Y	LED wallwash
F-2	TA-2	2	ea	21 W	0.042 Kw	0-10V		LED accentlight
Safe Area: OS/VS by Commissioner								
no zone	TM-2	4	ea	13 W	0.051 Kw	0-10V		surface mount LED retrofit lin.
				Total	0.157 Kw			

Performance Space: theatrical control system with dynamic color tuning wireless controls								
F-3	TC	3	ea	16 W	0.048 Kw	0-10V		LED wallwash
F-4	TM-1	15	ea	13 W	0.191 Kw	0-10V		surface mount LED retrofit lin.
F-5	SPARE							
F-6	TA	4	ea	14 W	0.056 Kw	0-10V		LED accentlight
F-7	TD	20	ea	18 W	0.360 Kw	wireless		LED retrofit c-clamp wallwash
	TD-1	2	ea	18 W	0.036 Kw	wireless		LED retrofit canopy mt wallwash
F-8	TA	2	ea	14 W	0.028 Kw	0-10V		LED accentlight
F-9	TC	2	ea	16 W	0.032 Kw	0-10V		LED wallwash
F-10	TJ	2	ea	2 W	0.003 Kw	0-10V		LED steplight with blue-gel
				Total	0.754 Kw			

END OF SECTION 26 09 43

SECTION 26 09 61 – THEATRICAL LIGHTING 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. This section includes furnishing the following equipment for installation as described under Section 260963:

1. Dimmer Racks
2. Intelligent Breaker Panels
3. Equipment Racks
4. House & Work Lighting Controls
5. Lighting System Ethernet Network
6. Control & Outlet Device Faceplates

B. Related sections include the following:

1. Theatrical Lighting Controls Installation
2. Common Work Results for Electrical
3. Interior Lighting Fixtures
4. Theatrical Lighting Fixtures
5. Testing of Electrical Systems

1.3 FULLY WORKING SYSTEMS

A. The Manufacturer is responsible for reviewing all Drawings and Specifications which affect the work in this Section. Notify the Commissioner whenever analysis of the Drawings and Specifications, or progress of other trades, indicates that the work in this Section cannot be completed as specified or as scheduled.

B. The Manufacturer shall provide any additional electrical and electronic parts and other necessary or auxiliary devices not specifically listed in these specifications or shown on the Drawings but needed to effect the functional requirements of the control systems, at no extra cost to the City of New York.

1.4 DEFINITIONS

A. Dimmer Rack: A cabinet accommodating dimmer modules, load and line connections, and circuit protection.

B. Plug-In Module: A modular unit that is installed in a standardized mounting location throughout the dimmer rack.

C. Dimmer Module: A plug-in module containing one or more dimmers.

D. Control Module: A plug-in module containing centralized control electronics for the dimmer modules.

E. Data Communication Protocol: A signal that provides control and feedback communications between devices in the system.

F. DMX 512: A data communications protocol compliant to the USITT DMX-512/1990 specification.

G. RDM: A data communications protocol compliant to the ANSI/PLASA Remote Device Management specification.

H. ACN: A data communications protocol compliant to the ANSI/PLASA Architecture for Control Networks specification.

I. POE: Power Over Ethernet: An 802.3AF compliant scheme of powering devices on an Ethernet system.

J. BACnet: A data communication protocol for building automation and control networks.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

1.6 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”

1.7 SUBMITTALS

A. Submit the following:

1. Bill of materials, with parts identified by common industry standard numbers and/or descriptions.
2. Specified manufacturer’s catalog cut sheets of all products called out in the bill of materials.
3. Statement that the Manufacturer agrees to the warranty provisions.
4. Projected timetable listing the time in weeks for each of the following activities:
    a. Shop drawing preparation.
    b. Fabrication.
    c. Shipping to site.
    d. System testing.
    e. As built drawing preparation.

B. Shop Drawings

1. Submit shop drawings for review. Drawing sheet size shall be uniform. Submittals of more than 5 drawings shall be bound. Shop drawings shall include:
    a. Pictorial drawings of all major components including sub-assemblies, parts list, dimensions, material and finish notes, quality assurance listings, and any other applicable information.
    b. Wiring diagrams of each component, including interconnections to other components.
    c. Accessories and spare parts list as specified, fully itemized.
2. Fabrication shall not commence until the Commissioner determine that the shop drawings are in compliance with the design intent of the Contract Documents.
3. Shop drawings shall be revised and resubmitted as required.

C. Manuals

1. Provide an operations and maintenance manual. The manual shall include:

   a. System description.
   b. Operation instructions, including safety measures.
   c. Maintenance instructions, including recommended procedures and schedules for inspecting system components.
   d. Catalog cuts for all purchased equipment.
   e. Recommended spare parts list.

2. Provide the above manuals on letter size and/or tabloid size paper, bound in standard 3-ring binders. Also provide documents in printable electronic format, such as PDF or other universal format files, on an archival quality storage media.

D. As-built Drawings

1. Within one month of system acceptance, provide complete as-built drawings. The as-built drawings shall include:

   a. All control schematics, risers, drawings of all system components.
   b. Final bill of materials.

2. Provide the above as-built drawings on tabloid size paper, bound in standard 3-ring binders. Also provide as-built drawings in printable electronic format, such as PDF or other universal format files, on an archival quality storage media.

1.8 PROJECT CONDITIONS

A. Submit written confirmation that related electrical work (as appears on the Contract Documents) provides the necessary physical accommodations for the installation and operation of the equipment in this Section.

1.9 WARRANTY

A. The Manufacturer shall warrant the equipment as follows:

1. For three (3) years from Substantial Completion, provide the services detailed below:

   a. Provide for the facility's operating staff a technical and operational assistance hotline advice service at no additional cost for the duration of the warranty period. Such advice to be available during normal working hours and on evenings and weekends.
   b. In-stock spares shall be available for major assemblies within 24 hours of the telephone call to the hotline establishing the need for such an exchange. For all exchanges not caused by misuse, there shall be no charge whatsoever to the City of New York, including no charge for parts and no charge for freight in either direction.
   c. The Warranty period shall commence upon substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Except where otherwise stated, the systems described herein shall be provided by a single manufacturer responsible for furnishing all products and services described on the Drawings and/or herein.

B. Manufacturer shall have a twenty four hour toll free emergency service phone line. A field service engineer shall respond to an emergency call on this line within thirty (30) minutes.

C. When a manufacturer's product has been replaced by a newer model prior to shipment, the later model shall be furnished provided the new model retains or exceeds all of the specified characteristics of the product specified herein. Products including control consoles, dimmer racks and network devices shall require a demonstration for the Commissioner.

D. All equipment must be tested and labeled at factory prior to shipment.

2.2 PARTS

A. All materials and equipment provided in the work of this Section shall be new and of high quality.

B. Manufacturers' part numbers are given occasionally to indicate levels of quality and type of product expected. Parts and items by other manufacturers that equal or exceed the quality and type of those referred to herein may be acceptable. The Commissioner shall be the sole judge of equivalence and acceptability.

2.3 GROUNDING

A. These systems shall be grounded, as shown on Drawings and/or at the advice of the Manufacturer.

2.4 CIRCUIT BREAKERS

A. The interrupting capacity of all primary and secondary circuit breakers for dimmers and relays shall be not less than 10,000 amperes SCCR.

B. Branch circuit breakers in equipment rack component mounting panels, control device faceplates, and outlet device faceplates shall be flat-front breakers or shall be protected by a circuit breaker toggle guard.

2.5 IDENTIFICATION LABELS

A. Provide labeling and signage for equipment as described herein and/or noted on the Drawings.

1. Use 1/4" (18 pt.) letters for equipment designations and headings.
2. Use 3/16" (12 pt.) letters for subsidiary information.

2.6 DIMMER RACKS

A. Provide theatrical dimming equipment as indicated on the Drawings and specified herein.

B. General

1. Dimmer racks shall be designed specifically for entertainment lighting. The dimmer racks shall be floor mounted, dead front switch boards complete with all dimmers, control electronics, timers, circuit breakers, and wiring terminations. No external components shall be required.
2. Auxiliary racks shall be available to provide mounting for a wide range of subcomponents including main circuit breakers, branch circuit breakers and control components.
3. Racks shall be designed for front access to allow back-to-back or side-by-side installation.
4. Dimmer rack dimensions shall not exceed 83.1" (211cm) high x 14.8" (38cm) wide x 22.8" (58cm) deep.
5. Dimmer racks shall operate on 90 to 264 VAC 3 phase, 4 wire + ground, 47 - 63 Hz service.
6. Racks shall accept a feed size of up to 800A per phase or as shown on Drawings. Bussing across multiple adjacent racks shall be possible. Delta power feeds shall be supported in racks designated for this purpose.
7. Power distribution shall be by copper buss bars. Aluminum buss bars shall not be acceptable.
8. Provide racks configured to receive the electrical services shown on the Drawings. If the quantity of dimmer modules specified, scheduled or required to compose a complete system requires additional rack spaces, provide internal inter-rack bussing to supply the additional required racks from the service shown.
9. Branch circuit load phase, neutral, and ground terminals shall accept as standard up to a #6 ($16mm^2$) gauge wire. An optional terminal adapter accepting up to #4 ($20mm^2$) gauge wire shall be provided as required.
10. The fault current protection rating of the rack shall be 100,000 SCCR minimum.
11. Plug-in modules shall be available in a variety of types, including 15A SCR dimmer, 20A SCR dimmer, 50A SCR dimmer, 100A SCR dimmer, 20A sinewave dimmer, 20A SCR dimmer with bypass, 20A relay and 20A constant breaker modules.
12. Racks shall be designed to allow easy insertion and removal of all modules without the use of tools. Supports shall be provided for precise alignment of dimmer modules into power and signal connector blocks. With modules removed, racks shall provide clear front access to all load, neutral and control terminations.
13. Module spaces shall be mechanically keyed to accept only the module type (20A, 50A or 100A) specified for that space. Racks that allow modules of varying wattages to plug into the same space shall not be acceptable. The rack shall be configurable to accept mixed dimmer types and sizes throughout the rack.
14. Provide ventilation of modules and control electronics by forced filtered air using multiple low-noise fans providing redundancy in case of fan failure.
    a. Configure fans to turn on when control is energized.
    b. Design dimmer rack to maintain the temperature of all components at proper operating levels with dimmers under full load, provided the ambient temperature of the dimmer room does not exceed 40°C/104°F.
    c. The fans shall remain on during thermal shutdown.

15. Module spaces and circuit breakers shall be labeled with name plates or tags permanently attached to the equipment with circuit identification text, character size not less than 1/4" (18 pt.) high. Circuit identification text shall be verified to match as-built conditions.
16. Dimmers and dimmer rack shall be UL/cUL listed and UL/cUL labeled.
17. Provide signage on the dimmer bank permanently attached to the equipment indicating the following information:
    a. Project name.
    b. Manufacturer name and contact information including location and service telephone number
18. Provide additional signage on each dimmer rack section permanently attached to the equipment indicating the following information:
    a. Performance space name.
    b. Equipment designation.
    c. Feed size and source identification.
    d. Schedule of dimmer numbers listing use, circuit identification, dimmer type, and load; verified to match final as-built conditions.
19. Provide vibration isolation pads for each dimmer rack. Isolators shall be double deflection neoprene-in-shear type with steel reinforced base. Neoprene shall be no harder than 50 durometer, minimum rated deflection .35 inches (9mm), capacity adequate for manufacturer's dimmer rack weight.

C. Electronics

1. Control electronics shall use digital electronic circuitry, be microprocessor based, and designed specifically for the control of dimming systems.
2. Dimmer rack setup and rack status, dimmer load, and dimmer temperature monitoring shall be fully user programmable locally at each dimmer rack and remotely via personal computer connected to the stage lighting network. Setup and monitoring functions shall be available with multi-language support.
3. Dimmer racks shall have the capacity to adjust output voltage per dimmer module to any predetermined waveform. Curves shall be available for installation through rack and/or control console software. Field adjustment of dimming curve shall not be required for standard operation.
4. System configuration, operating parameters, presets, levels and fade times shall be field modifiable and shall not require components to be returned to the Manufacturer for such modifications.
5. Control modules shall accept two (2) DMX-512/1990 control signal inputs and Category 5 or greater IEEE 802.3 Ethernet interface including sACN/ACN network protocols, in addition to any proprietary protocol control signals supported by the Manufacturer. An opto-isolated contact input shall be provided for panic system control.
6. Control signal input of each individual dimmer rack shall be fully opto-isolated from control signal input of any other rack, and fully opto-isolated from any control signal output.

2.7 DIMMER MODULES

A. SCR Dimmer Modules

1. The dimmer modules shall be designed using advanced, state-of-the-art components specifically for entertainment lighting.
2. Each SCR dimmer module shall include status reporting features via the dimmer rack control electronics module and/or via a lighting control console. Reported data shall include load (wattage), absence of load, device failure, circuit breaker tripping, dimmer error, and dimmer module removal.
3. Each dimmer module shall contain circuit breakers, a solid-state switching module, associated toroidal filters, and power and control connectors.
4. Modules shall be keyed so that dimmer modules of different capacity shall not be interchangeable.
5. Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature. Circuit breakers shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current. Circuit breakers shall be rated for 100 percent switching duty applications. Dimmers that do not operate continuously at 100 percent load shall not be acceptable.
6. SSR devices shall be encapsulated in high impact plastic cases packaged with associated optically isolated firing circuits and control circuitry. There shall be a minimum of 2,500 volts RMS of isolation between the AC line and the control lines of the SSR.
7. The SSR block shall include an integral heat sink and all necessary connections for line load and control as a single plug in assembly. Service and exchange of this component shall be a simple plug in operation.
8. Each dimmer module shall have an integral inductive filter to reduce the rate of current rise time resulting from the SCR switching on. The filter shall limit objectionable harmonics, reduce lamp filament sing and limit the radio frequency interference on line and load conductors.
9. Each “standard” dimmer shall have a rise time of not less than 500µs measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 300 mill volts per microsecond in any point of the wave under full load conditions.
10. Each “high-rise” dimmer shall have a rise time of not less than 800µs measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 210 mill volts per microsecond in any point of the wave under full load conditions.
11. The dimmer module shall be capable of "hot patching" cold, incandescent loads up to its full rated capacity without malfunction with the control signal at full ON.
12. The dimmer power efficiency shall be at least 97% at full load with a no load loss of 3V RMS for type “standard” dimmers.
13. Dimmers shall not interact with each other during any executable cue sequence of individual and/or collective control level changes. There shall be no interaction due to the size and/or changing of currents in the neutral or other feeders.

B. Dimmer With Bypass Modules

1. Dimmer with bypass modules shall be designed for complete flexibility of choice for dimmed, non-dim, or hot power on each 20A branch circuit. A single module shall provide:

a. Two dimmed outputs with 500µs rise times, controlled by DMX, or
b. Two air gap relay switched outputs controlled by DMX, or
c. Two manual bypass constant power circuits controlled manually.

2. The module may be configured to operate as two dimmers, two relays, or any combination of relay and dimmer from the dimmer rack control module or from manufacturer's control console connected to a network-based system. Any single circuit may be set to bypass the dimmer using a switch on the front of the module.
3. Module construction shall be similar in all respects to standard dimmer modules and shall be interchangeable with modules of the same rating.
4. All dimmer with bypass modules shall be fully status reporting.

C. Non-Dim & Constant Modules

1. Non-dim modules shall utilize a latching type relay and have a full magnetic primary circuit breaker. Modules employing solid state relays shall not be acceptable.
2. Constant circuit modules shall distribute overcurrent protected power from the dimmer rack to non-dimmed loads. There shall be no moving parts other than the circuit breakers.
3. Module construction shall be similar in all respects to standard dimmer modules and shall be interchangeable with modules of the same rating.
4. All non-dim modules shall be fully status reporting.

D. Fluorescent Dimmer Modules

1. Fluorescent dimmer modules shall provide operating power and dimming control to three-wire electronic dimmer ballasts for fluorescent fixtures.
2. Dimmer modules shall be available with current ratings of 20 amps (120 volts).
3. Module construction shall be similar in all respects to standard dimmer modules.
4. Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature. Circuit breakers shall be rated for 100 percent switching duty applications.
5. All fluorescent dimmer modules shall be fully status reporting.

2.8 INTELLIGENT BREAKER PANELS

A. Provide intelligent breaker panels with pole count for branch circuits as shown on the Drawings. Relay panels shall have the following characteristics:

1. Relay panels shall be designed specifically for entertainment lighting. The relay panels shall be wall mounted complete with all relays, control electronics, timers, and wiring terminations. No external components shall be required.
2. Relay panel dimensions shall not exceed 64" (163cm) high x 20" (51cm) wide x 5.6" (14cm) deep.

3. Panels shall be mains fed, with three-phase 120/208V main breaker sized as shown on the Drawings.
4. Voltage separation shall be provided between high voltage and low voltage compartments of the panel, and shall separate branch circuits of varying voltages.
5. Branch load circuit breakers shall be provided as required for branch load terminations.
6. It shall be possible to freely mix one-, two- and three-pole intelligent breakers up to 30A.
7. Breakers shall provide manual switching control while power is unavailable to the panel such that critical lighting can be set to an on state, without the need for power to the panel.
8. Breaker panels shall be controlled via an integral microprocessor based programmable lighting controller with a DMX512 interface and Category 5 or greater IEEE 802.3 Ethernet interface for sACN/ACN network protocols.
9. DMX control channel assignment shall be easily field modified, allowing non-sequential numbering and functional grouping of relays to a single DMX channel as required.
10. Ethernet interface shall provide advanced control of breakers over streaming ACN (sACN) and transmit status, control override, and measured energy usage per branch circuit to web browser based interface or central monitoring interface.
11. A Low Voltage 0-10V Dimming Option shall link each of the 24 0-10V outputs with a breaker circuit in the panel. Each output shall support up to 400mA of current sink for support of at least 50 LED drivers of fluorescent ballasts.
12. A Contact Input Option shall allow 24 dry contact inputs to be linked for direct or group breaker control, to activate a preset, or to activate a sequence. Controller software shall allow for normally open maintained, normally closed maintained or momentary toggle.
13. A DALI Control Option shall provide 24 control loops of broadcast DALI control with each loop controlling up to 64 ballasts. An external DALI loop power supply shall also be provided.
14. A RideThru Option shall provide short-term power backup of control electronics by automatically engaging when power is lost, and recharging when normal power is present.
15. The panel shall have a UL924-listed contact input for use in Emergency Lighting systems. The panel shall respond to the contact input by setting included breakers to “on”, while setting non-emergency breakers “off”. Each breaker can be selected for activation upon contact input.
16. The panel shall be convection cooled. Panels that require the use of cooling fans shall not be acceptable.

B. Breaker panels shall be UL508, UL67, and UL924 listed and shall be UL labeled.

C. Breakers shall be UL489 listed and shall be UL labeled.

D. Provide signage on the breaker panel permanently attached to the equipment indicating the following information:

1. Project name.
2. Manufacturer name and contact information including location and service telephone number.

E. Provide additional signage on each panel section permanently attached to the equipment indicating the following information:

1. Performance venue name.
2. Equipment designation.
3. Feed size and source identification.
4. Schedule of breaker numbers listing use, circuit identification, breaker type, and load; verified to match final as-built conditions.

2.9 RELAY PANELS

A. Provide relay panels with pole count for branch circuits and power configuration as shown on the Drawings. Relay panels shall have the following characteristics:

1. Voltage separation shall be provided between high voltage and low voltage compartments of the panel, and shall separate branch circuits of varying voltages.
2. Branch load circuit breakers shall be provided as required for branch load terminations.
3. Relays shall be capable of simultaneous on/off within a given relay cabinet enclosure. Sequenced switching shall not be acceptable.
4. Relays shall be mechanically latching. Electronically held or solid state relays shall not be acceptable.
5. Relay panels shall be controlled via a microprocessor based programmable lighting controller with a DMX512 interface and Category 5 or greater IEEE 802.3 Ethernet interface for sACN/ACN network protocols.
6. DMX control channel assignment shall be easily field modified, allowing non-sequential numbering and functional grouping of relays to a single DMX channel as required.

B. Relay panels shall be UL/cUL listed and UL/cUL labeled.

C. Provide signage on the relay panel permanently attached to the equipment indicating the following information:

1. Project name.
2. Manufacturer name and contact information including location and service telephone number

D. Provide additional signage on each panel section permanently attached to the equipment indicating the following information:

1. Performance venue name.
2. Equipment designation.
3. Feed size and source identification.
4. Schedule of relay numbers listing use, circuit identification, relay type, and load; verified to match final as-built conditions.

2.10 EQUIPMENT RACKS

A. Provide fully enclosed self-standing cabinets as shown on the Drawings.

B. Cabinets shall have roll-out rotating equipment frame detachable from host rack enclosure.

C. Frames, closure panels, and doors shall be painted semi-gloss black.

D. Equipment and components mounted in Equipment Racks shall be as shown on the Drawings and described herein.

E. If the equipment specified, scheduled or required to compose a complete system requires additional rack spaces, utilize area of blank filler panels and provide additional cabinets as necessary.

F. Component mounting panels and blank filler panels shall be as specified and as shown on the Drawings. Legends and lines where shown shall be engraved in the panels and filled with engraver's enamel.

G. Provide blank filler panels in the racks for the facility's use. The internal space behind these blank panels shall not be used or obstructed.

H. Provide non-combustible brackets, shelves, and other supports for heavy components and internal wiring assemblies and harnesses. Provide interior mounting angles to support work-writing tops and drawers.

I. Wire the components on each panel to a numbered barrier terminal block with a 3'-0" (1m) long flexible cable harness. Attach terminal blocks to frames in line with their associated panels so that they do not interfere with adjacent component or blank panels.

J. Provide signage on each equipment rack permanently attached to the equipment indicating the following information:

1. Project name.
2. Performance venue name.
3. Equipment designation.
4. Manufacturer name and contact information including location and service telephone number.

2.11 HOUSE & WORK LIGHTING CONTROLS

A. Provide an integrated microprocessor based control system that functions independently and in conjunction with the lighting control console. The system shall have the capacity to control dimmer racks, relay panels, LED arrays, moving lights, and other DMX/RDM or sACN/ACN devices through remote control stations and programmed control events.

B. The control system shall consist of components as shown on the Drawings and described in this specification, and shall have the following characteristics and functions:

1. The lighting control processor shall allow programming and selection for playback of a minimum of (512) different preset lighting states and control of the fade time between presets.
2. It shall be possible to modify the rate of a fade time from a control within the system.
3. The total output may be the combination of many different presets running concurrently.

a. Multiple presets controlling the same attribute shall first interact based on priority and second based on latest takes precedence (LTP) or highest takes precedence (HTP) as configured.

b. A preset may be designated as an HTP override and shall cause HTP values to be discarded. It shall be possible to specify that a preset or attribute will persist when overridden.
c. When in use, the lighting control console shall override preset levels on a HTP basis. Where there are multiple external sources then priority and HTP shall be used to perform arbitration.

4. The system shall have the ability to "snapshot" DMX levels from the lighting control console and other DMX control devices on the network and record into preset states all DMX values including dimmed circuits, relay circuits, LED arrays, moving lights and other DMX devices in the system up to a capacity of 2048 DMX channels.
5. The system shall support 10/100BaseTX, UDP message transmission and receipt, 802.3af compliant Ethernet networking using TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols for internal communication and integration with third-party equipment.
6. Interconnection of houselighting control processors between venues shall be via a dedicated Ethernet network, utilizing input filtering to maintain separation of ACN and sACN protocals discrete to each venue while allowing for centralized control of house and work lighting states.
7. The system shall interface with external control systems using ASHRAE's BACnet IP building-systems protocol to bi-directionally listen, register, reply to and execute BACnet event-scheduling commands.
8. The system shall support EIA-RS232 serial protocol for bi-directional command and communication interconnection with other similarly enabled external systems. Serial input and output messages shall be fully customizable.
9. The system shall accept dry contact closure inputs for integration with third-party products.
10. There shall be support for occupancy functions using proximity sensors and for daylight harvesting functions using photo sensors.
11. The system shall support the use of Network Time Protocol for real time clock synchronization.
12. It shall be possible to trigger control events using local and remote control stations, via recurring calendar-based time clock schedule, astronomical timed events, using occupancy sensing systems, or via interfaced external systems.
13. Control stations shall provide real-time status indication representing the active state of all presets, zones and/or devices assigned to the remote station by use of illuminated pushbuttons and graphic controls.
14. It shall be possible to disable remote indicators and to lockout or fully disable remote control devices through end user configuration.
15. Data storage facilities shall retain memory for an indefinite period of time. In case of power failure, the system shall retain preset memory for a minimum of 72 hours.

C. Houselight Master Stations

1. The houselight master station shall be a color LCD capacitive touchpanel in quantities and locations as shown on Drawings.
2. Provide sheet metal backbox and mounting frames as required.

3. Houselight master station shall provide control of lighting processor presets, sequences, fade times, macros, timeclock events, and interfaced external systems.
4. Houselight control processing may be achieved using electronics internal to the display or via an external interface.
5. Stations shall operate using graphic buttons, faders, and other images on programmable control pages. There shall be up to thirty (30) custom control pages available.
6. Graphic controls shall represent the active state of all presets, zones and devices. Status indication shall be tracked across all stations in real-time including tracking of fades on graphical fader controls.
7. Stations shall allow programming of multiple-level passcodes, page lockout and visibility.
8. Page layout and interface functionality shall be determined by the Commissioner following approval of shop drawings. Programming services shall be provided by the Manufacturer.
9. Minor adjustments to programming shall be provided by the Manufacturer in the field as required during system testing and acceptance.
10. A single major revision to programming, including a full redesign of page layout and interface functionality, shall be provided by the Manufacturer during the warranty period upon request by the Comissioner.
11. Control pages shall include:
    a. Houselight presets (House Full, House Half, House Preset, House Out, Tour, Cleaning); worklight presets (Pre-Show, Show, Post-Show, Rehearsal, Work, Off); systemwide presets (Blackout, Night).
    b. Stage lighting presets with snapshot record function.
    c. Houselight zone faders and houselight master fader.
    d. Color picker for dynamic selection of color with LED and multi-parameter fixtures.
    e. Worklight, runlight and non-dim zone control buttons.
    f. Lockout function to disable other stations and remote switches.
    g. Setup display for administrative functions including timed-event creation, edit and override.
    h. Console video display for networked Lighting Control Consoles.
    i. Controls for Lighting Control Console commands, macros, and parameter levels.
    j. Dimmer rack status and configuration, including aggregation of dimmer module status reporting data with summary of real-time dimming and switching load (wattage) across all racks.
    k. DMX node/gateway status and configuration.
12. Houselight master station shall be connected to the control system using Category 6 or better wire.
13. Wireless houselight master stations shall include docking station for power charging and wired data connection.
14. Wireless access points shall provide connection between the wireless touchscreen and the lighting control system using IEEE 802.15 ZigBee wireless communications.

D. Preset Stations

1. Preset Stations shall consist of programmable momentary pushbutton switches in a face panel designed for flush or surface mounting and housed in a standard NEMA backbox.
2. Face panel material and finish shall be per Commissioner. Face panel shall include engraving, indicators and button quantities as shown on the Drawings.
3. Pushbuttons shall provide control of a single channel, lighting processor presets, sequences, fade times, macros, timeclock events, and interfaced external systems as required.
4. Preset Stations shall connect to the control system using Manufacturer's recommended wire type, network topology, and communication protocols.

E. Remote Worklight Switches

1. Remote Worklight Switches shall consist of EAO Series 61 momentary pushbutton switches mounted in a 1/8" (3mm) T-5 aluminum component mounting panel and housed in a standard NEMA backbox.
2. Face panel finish shall be per Commissioner. Face panel shall include engraving, indicators and button quantities as shown on the Drawings.
3. Pushbutton momentary switches shall be illuminated, with colored lens as noted on the Drawings.
4. Remote worklight switches shall provide control of a single channel or presets as required.
5. Electronics shall consist of an interface board connected to the control system using Manufacturer's recommended wire type, network topology, and communication protocols.

2.12 LIGHTING SYSTEM ETHERNET NETWORK

A. Provide a fully functioning Ethernet system. Systems using proprietary formats or protocols other than TCP/IP shall not be accepted.

B. Network Components

1. Provide PoE+ Gigabit Ethernet switches in quantities and locations shown in the Drawings and described herein.
    a. Switches shall support Layer 2 and Layer 3 routing.
    b. Switches shall contain auto-sensing ports supporting 100Base-T and 10Base-T. Switches shall support IEEE 802.3i Type 100Base-T standard.
    c. Switches shall have high mean time between failure (MTBF) value as comparatively analyzed with industry standard products.
    d. Switches shall be rack mounted in standard 19" racks.
    e. Switches shall have UTP ports on the front face for connection to other network devices via standard 19" patch panels.
    f. Provide ports or media converter modules as required for UTP to Fiber-Optic conversion.
    g. Provide switches in quantities and configurations having sufficient UTP ports for simultaneous connection of all patch bay ports assigned to lighting network devices.

2. Provide Category 6 or better patch bays as required for termination of network cabling.
    a. Patch bays shall be rack mounted in standard 19" racks.
    b. Provide Category 6 or better patch cords as required for connection between the patch bays, switches and other network devices.
    c. Provide rack mounted standard 19" cable management systems for each patch panel.
3. Provide lighting Network Services Gateway(s) as shown on Drawings.
    a. The lighting network service gateway shall be a microprocessor-based unit specifically designed to provide network services and storage for entertainment and architectural lighting control systems specified herein. The gateway shall provide all necessary network services for automatic network configuration of lighting control system components over an Ethernet network.
    b. The gateway shall support multiple protocols including:
        1) Dynamic Host Control Protocol (DHCP) for automatic assignment of IP addresses to the entire lighting control system.
        2) Dynamic Name Service (DNS).
        3) Simple Network Time Protocol (sNTP) for automatic time assignment and synchronization of the lighting control system.
        4) File Transfer Protocol (FTP) for configuration storage and backup.
        5) Windows File Sharing (SMB) for configuration and file storage and backup.
    c. The gateway shall support real-time logging and notification of system errors.
    d. The gateway shall support storage of system device configurations and complete stem configurations.
    e. User definable reports that detail historical errors and power usage shall be supported. Reports shall be generated using the gateway database and queried from manufacturer's configuration software or third party applications.
4. Provide DMX Gateways in quantities and types as shown on Drawings.
    a. DMX Gateways shall be an intelligent Ethernet device providing DMX & RDM data distribution over the Ethernet data network. Gateways shall be connected using Category 6 or better wire, and powered via its Ethernet connection using Power Over Ethernet (IEEE 802.3af). Ethernet connection receptacle shall be Neutrik Ethercon D-Series CAT5e receptacle or Neutrik Ethercon CAT6A receptacle.
    b. DMX Gateways shall support ANSI E1.17 ACN and sACN network protocols. Products that do not support ANSI E1.17 shall not be acceptable.
    c. There shall be as standard DMX512 5-pin XLR connectors. It shall be possible to factory configure the connectors to be male or female to meet project requirements.

d. The DMX Gateways shall be remotely configurable via the network system wiring using manufacturer's software, control console interface and a standard Web Browser. The specific DMX channels input or output by the Gateway shall be freely configurable by the user. Configuration of the Gateway shall be stored in non-volatile memory.
e. Portable Gateways shall be provided with appropriate mounting hardware for 1.9" (48mm) O.D. pipe as shown on Drawings.
f. Portable Gateways shall be supplied with a 5'-0" (1.5m) Category 6 or better cable extension for each node.

5. Furnish portable 802.11n PoE Wireless Access Points (WAPs) for use with wireless network devices including user-furnished laptop computers, tablets, and smartphones.
   a. WAPs shall each be supplied with a 5'-0" (1.5m) Category 6 or better cable extension.
   b. Furnish two (2) WAPs.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 SUPERVISION OF INSTALLATION

A. Manufacturer shall provide instruction and supervision to the Division 26 Contractor as it pertains to the installation of these systems. Provide the necessary personnel for coordination meetings and site visits as requested by the Division 26 Contractor.

3.3 TESTING

A. Manufacturer shall provide the services of a qualified on-site engineering representative who shall perform the following:
   1. Supervise and instruct equipment installer in all Manufacturer's requirements and specifications.
   2. Prior to system energization, inspect the finished installation and confirm that the installation conforms to manufacturer's requirements and specifications. Supervise correction of any deficiencies and retest deficient items.
   3. Manufacturer's engineering representative shall be present during energization of the system.
   4. In conjunction with the equipment installer, measure and adjust the full dimmer output voltage at each stage lighting receptacle. Typical voltage shall be uniform at each receptacle regardless of branch wiring length. Specific voltage requirements shall be determined by the Commissioner.
   5. Verify operation of all control devices and network wiring.
   6. Coordinate integration with AV controls specified under Division 27.
   7. Coordinate integration with window shade controls.
   8. Configure all hardware and software to a "show ready" state, including:
      a. Network device addressing.
      b. Ethernet switches configured for industry standard control protocols.

c. Dimmer and relay patch, dimmer curves, dimmer output voltage, control priority and similar variables.
d. Architecturural lighting DMX fixture addressing.
e. Houselight control zones, presets, sequences, fade times, macros, timeclock events, and interfaced external systems.
f. Lighting control console patched 1 to 1 for all control channels in system.
g. Console accessories such as remote video, tracking backup, and hand-held remote configured to operate with main lighting control console.
h. DMX node/gateway patch, priority, and soft labeling.
i. Lighting system computer software.

B. Provide to the Commissioner a written report confirming that the system has been properly installed and successfully energized within fourteen (14) days of energization.

3.4 DEMONSTRATION AND ACCEPTANCE

A. The Commissioner shall witness a full demonstration by the Manufacturer of each feature of each piece of equipment in the system. Comply with the following conditions:

1. The Manufacturer shall provide all necessary personnel and equipment to demonstrate fully the system's compliance to the specifications.
2. Contractor's project representative shall be present during testing as required.
3. Full and uninterrupted access to all areas shall be provided as necessary for complete testing and demonstration.
4. All loose equipment provided under this Section shall be on site and available for testing.
5. All Architectural lighting fixtures circuited to the control system shall be installed and operational.

3.5 INSTRUCTION

A. Provide a factory field service representative to offer instruction to the end user's staff in the proper operation and maintenance of the control systems for at least two (2) full days at a date and time convenient to the end user.

END OF SECTION 26 09 61

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SECTION 26 09 63 – THEATRICAL LIGHTING CONTROLS INSTALLATION

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. The work of this Section includes all labor, materials, equipment and services necessary to install the electrical work associated with the Theatrical Lighting Controls, as described in Section 260961 and shown on the Drawings.

B. Related sections include the following:

1. Section 26 09 61 Theatrical Lighting Controls
2. Section 26 05 00 Common Work Results for Electrical
3. Section 26 50 00 Lighting

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

1.4 CERTIFICATIONS

A. The Contractor shall submit (as part of the Owner’s Manual) certificates from the manufacturer stating that the installed system is operating properly and complies with the manufacturer’s recommendations. This information shall be incorporated in the Owner’s Manual, as described in 260961

B. The Contractor shall submit a certificate that the Ethernet system has been tested and complies with all IEEE 802.3, ISO/IEC 8802-3 and PLASA standards. This information shall be incorporated as an appendix to the Owner’s Manual, as described in 26 09 61 “Theatrical Lighting Controls”.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 PROTECTION OF EQUIPMENT

A. Protect the equipment in this and Related Sections from damage and deterioration during all phases of the work, from the time of manufacture to the acceptance of the completed installation.

B. The Theatrical Lighting Controls equipment furnished under Section 260961 will be the responsibility of the installer until Substantial Completion.

3.3 INSTALLATION

A. Install stage lighting controls system as located on the drawings. Installation shall be in accordance with manufacturer's written instructions, recognized industry practice, and applicable requirements of the National Electrical Code and UL standards.

B. All load circuit conductors and data wiring for these systems shall be installed in metallic conduit, metal wireways, surface metal raceways, or other approved cable containment. All conduits for these systems shall be 1" minimum. Heavy wall, rigid, galvanized steel conduit shall be installed where exposed or where required by Code. Electrical Metallic Tubing (EMT) may be installed concealed in hung ceilings or walls. Flexible conduit shall be only used for short lengths. Use of armored cable shall not be accepted without prior approval. Aluminum conduit and wire shall not be used.

C. Do not exceed 40% conduit fill.

D. Voltage separation shall be maintained between line voltage, low voltage and data wiring.

E. All load circuit conductors shall be continuous from the dimmer room to the outlet devices or architectural fixture.

F. All dimmer rack load circuits must have individual neutral conductors. Neutral conductors must be routed directly adjacent to the live conductors of each circuit.

G. Power wiring shall be sized to limit the voltage drop in branch circuits to 2% to the farthest outlet, and to 5% total for feeders and branch circuits.

H. All data wiring shall be continuous from termination point to termination point; no splices or inline connectors shall be allowed.

I. Field terminations in these systems shall be as follows:

1. Main feed wires shall terminate in pressure lugs on buss bars.
2. Branch load wires shall terminate on screw terminals on barrier terminal blocks, circuit breakers and switches.
3. Control wires shall terminate on screw terminals on barrier terminal blocks and switches, or as noted.
4. Ethernet cables shall be installed and tested in compliance with all IEEE 802.3.ISO/IEC 8802-3 and ETSA standards.

J. Wire nuts and field soldered connections, except where noted, are not acceptable in these systems.

K. These systems shall be grounded, as shown on drawings and in accordance with applicable codes and regulations and/or at the advice of the Manufacturer.

L. Network Cabling

1. Theatrical lighting control system data cabling shown in Drawings to convey design intent only. Final quantities, types, and topologies shall be per the Manufacturer's approved shop drawings.
2. Provide Fiber Optic Cable as required for all runs greater than 300'-0" (90m) or as specifically shown in the Drawings.
    a. Confirm all cable routing distances to determine appropriate use of fiber runs.
    b. Cable shall be 62.5/125µm fiber optic cable as required to support network components.
    c. Cable shall exceed the IEEE802.3z Gigabit Ethernet Fiber specification for 62.5/125µm fiber.
    d. Cable shall exceed the TIA/EIA 568B Fiber specification.
3. Provide UTP Cable as required for all runs under 300'-0" (90m) unless specifically shown as Fiber Optic Cable in the Drawings.
    a. Copper cabling and connecting hardware shall fully comply with TIA/EIA 568B standards and with the standard installation of Category 6 products.

3.4 TESTING

A. Prior to energization of the system, perform the following tests and inspections following the instructions of the equipment Manufacturer's on-site engineering representative. Correct deficiencies and retest deficient items.
    1. Inspect each outlet, faceplate, device and loose equipment for defects, finish failure, corrosion, physical damage, correct labeling, and nameplate.
    2. Perform operational tests on mechanical parts and operable devices according to manufacturer's instructions or routine functional operation.
    3. Check tightness of electrical connections with torque wrench calibrated within the previous six (6) months using Manufacturer's recommended torque values.
    4. Perform continuity testing of each branch load circuit receptacle, determining correct polarity of wiring and correspondence between circuit numbers and labeling. Continuity Test Report shall be available upon request. Any problem(s), i.e. open circuit, short circuit, wrong termination, etc. shall be rectified in a timely manner and re-tested.
    5. Test and certify Ethernet network for compliance with all IEEE 802.3, ISO/IEC 8802-3 and ANSI/PLASA standards. Network Compliance Test Report shall be available upon request. Any problem(s), i.e. cable length exceeding standards, open circuit, short circuit, wrong termination, etc. shall be rectified in a timely manner and re-tested. Submit final test report data and letter of certification for inclusion as an appendix to the Manufacturer's Instruction and Maintenance Manual.

B. Energization of the system shall only commence following written approval of the Manufacturer, and shall take place in the presence of the Manufacturer's on-site engineering representative.

C. In conjunction with the Manufacturer's engineering representative, measure and adjust the full dimmer output voltage at each stage lighting receptacle. Typical voltage shall be uniform at each receptacle regardless of branch wiring length. Specific voltage requirements shall be determined by the Commissioner.

3.5 DEMONSTRATION AND ACCEPTANCE

A. Upon completion of testing as described herein and under Related Sections, Contractor shall certify in writing that the installation is complete and ready for final inspection by the Commissioner.

B. The Commissioner shall witness a full demonstration of each feature of each piece of equipment in the system. Comply with the following conditions:

1. Contractor shall provide all necessary personnel and equipment to demonstrate fully the system’s compliance to the specifications.
2. Contractor’s project representative shall be present during testing as required.
3. Full and uninterrupted access to all areas shall be provided as necessary for complete testing and demonstration.
4. All loose equipment provided under this and Related Sections shall be on site and available for testing.
5. All architectural lighting fixtures circuited to the dimming system shall be installed and lamped.

END OF SECTION 26 09 63

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. This Section includes the following:

1. Lighting and appliance branch circuit panelboards.
2. Power and distribution panelboards.

B. Related Sections

1. Section 26 28 13 “Fuses” for fuses.
2. Section 26 2816.13 “Enclosed Circuit Breakers” for breakers.
3. Section 26 28 16.16 “Enclosed Switches” for switches.

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 panelboard, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. 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.

C. 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.

D. 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.

E. Operation and Maintenance Data: For panelboards and components 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 New York City Electrical Code - 2011.

1.6 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.

1.7 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).

1.8 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 PANELBOARD MANUFACTURERS

A. Manufacturers

1. Siemens Energy & Automation, Inc.

2. General Electric Co.; Electrical Distribution & Control Div.

3. Eaton Corp.; Cutler-Hammer Products.

4. Square D Co.

5. 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 DISTRIBUTION PANELBOARDS

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. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
   1. For doors more than 36 inches high, provide two latches, keyed alike.

D. Mains: Circuit breaker, lugs only or fused as indicated on drawings.

E. Branch Overcurrent Protective Devices for Circuit-Breaker
1. Frame Sizes 125 A and Smaller: Plug-in circuit breakers.

2. Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

F. Contactors in Main Bus: NEMA ICS 2, Class A, electrically or mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection

2.4 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.

2.5 OVERCURRENT PROTECTIVE DEVICES

A. As described in Section 26 28 13 “Fuses”, Section 26 2816.13 “Enclosed Circuit Breakers” and Section 26 28 16.16 “Enclosed Switches”.

2.6 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 28 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 disconnect means.

2.7 PANELBOARD SHORT CIRCUIT RATINGS

A. Panelboards and Panelettes (load centers) 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 overcurrent 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 200,000 amps when used in conjunction with appropriate current limiting fuses as specified.

2. Distribution and power panels must be "fully rated" for not less than 150,000 100,000 65,000 42,000 22,000 amps.

3. Lighting and appliance panels must be series rated for not less than 150,000 100,000 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. Mount top of trim 74 inches (188 cm) above finished floor, unless otherwise indicated.

C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Install overcurrent protective devices and controllers.

1. Set field-adjustable switches and circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. 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.

G. 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 for Electrical Systems."

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 25 05 26 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables”.

3.5 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 27 13 - ELECTRICTY 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 provisions for the accommodation of Con Edison metering equipment.

B. Related Sections

1. Section 26 05 19 "Low-Voltage Electrical Power Conductor and Cables" for power conductors and cables.
2. Section 26 05 33 "Raceways and Boxes for Electrical Systems" for raceways.

1.3 SUBMITTAL PROCEDURES

A. Refer top DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Submit the following:

1. Product data for each product and component specified.
2. Shop drawings of Con Edison metering provisions.

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 New York City Electrical Code -2011, Article 100.

C. Electrical Component Standard: Components and installation must comply with New York City Electrical Code- 2011, NFPA 70-2008.

1.6 GENERAL

A. All electricity delivered to the project will be Con Edison company metered through various metering installations as follows:

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 Con Edison.

E. Meters will be furnished by the Con Edison.

F. All work for the metering installation must be provided in accordance with the Con Edison Blue Book.

PART 2 – PRODUCTS

2.1 EQUIPMENT FOR ELECTRICITY METERING

A. Meters will be furnished by Con Edison company.

B. Current-Transformer Cabinets: Comply with requirements of electrical-power Con Edison company.

C. Meter Sockets: Comply with requirements of electrical-power Con Edison Company company.

D. Meter Sockets: Steady-state and short-circuit current ratings shall meet indicated circuit ratings.

E. Modular Meter Center: Factory-coordinated assembly of a main service terminal box with lugs only, wireways, tenant meter socket modules, and tenant feeder circuit breakers arranged in adjacent vertical sections. Assembly shall be complete with interconnecting buses and other features as specified below.

1. Manufacturers

   a. Square D
   b. Eaton
   c. SIEMENS Industry, Inc
   d. General Electric Company
   e. Or approved equal

2. Comply with requirements of Con Edison for meter center.
3. Housing: NEMA 250, Type 1 enclosure.

4. Minimum Short-Circuit Rating: 100,000 A symmetrical at rated voltage unless Contractor submits calculation based on incoming short circuit rating provided Con Edison to show that a lower rating is acceptable.
5. Main Disconnect Device: Circuit breaker, series-combination rated for use with downstream feeder and branch circuit breakers.
6. Main Disconnect Device: Fusible switch, series-combination rated by circuit-breaker manufacturer to protect downstream feeder and branch circuit breakers.
7. Branch Feeder Circuit Breakers: Series-combination-rated molded-case units, rated to protect circuit breakers in downstream tenant and to house load centers and panelboards that have 10,000-A interrupting capacity.
8. Identification: Complying with requirements in Section 260553 "Identification for Electrical Systems".
9. Physical Protection: Tamper resistant, with hasp for padlock.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Comply with equipment installation requirements in NECA 1.

B. Install meters furnished by Con Edison.

C. Install raceways and equipment according to Con Edison company's written requirements.

D. Provide empty conduits for metering leads and extend grounding connections as required by Con Edison.

END OF SECTION 26 27 13

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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 SUMMARY

A. 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.

B. Related Sections

1. Section 26 05 53 “Identification for Electrical Systems” for identifications.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Samples: Submit one sample of each type device and cover plate.

C. Manufacturer's Instructions:
1. Indicate application conditions and limitations of use stipulated by product testing agency.
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 experience.

1.7 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.

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: Subject to compliance with requirements, provide products by Lutron as indicated or comparable products by other listed manufacturers.

   1. Single-pole switch:
      a. Lutron Nova-T NT-1PS-SN.
      b. Leviton.
      c. Hubbel.
      d. Or approved equal.

   2. Double-pole switch:
      a. Lutron Nova-T multi gang
      b. Leviton
      c. Hubbell.
      d. Or approved equal.

   3. Three-way switch:
      a. Lutron Nova-T NT-3PS-SN.
      b. Leviton.
      c. Hubbell.
      d. Or approved equal.

   4. Four-way switch:

a. Lutron Nova-T NT-4PS-SN.
b. Leviton.
c. Hubbell.
d. 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: Subject to compliance with requirements, provide products by Lutron as indicated or comparable products by other listed manufacturers.

1. Duplex convenience receptacle:
a. Lutron Nova-T NTR-20-ST.
b. Leviton.
c. Hubbell.
d. Or approved equal.

2. GFCI receptacle:
a. Lutron Nova-T NTR-20-GFCI-ST.
b. Leviton.
c. Hubbell.
d. Or approved equal

3. Special Receptacle:
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 products by Lutron as indicated or comparable products by other listed manufacturers.
a. Lutron Nova-T.
b. Leviton.
c. Hubbell,

d. or approved equal.

B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasket device cover.

1. Manufacturer: Subject to compliance with requirements, provide 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 other trades) as per Section 26 05 53 “Identification for Electrical Systems”.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes 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 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 cartridge fuses, rated 600 V and less, for use in switches, switchboards, controllers and spare fuse cabinets.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Product Data: Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings for each fuse type indicated.

B. 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.

C. Maintenance Data: For fuses to include in emergency operation and maintenance manuals.

1. Include the following:

a. Let-through current curves fuses with current-limiting characteristics.
b. Time-Current curve, coordination charts and tables, and related data.

1.5 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 - 2008, Article 100 and marked for intended use.

D. Comply with NEMA FU 1.

E. Comply with New York City Electrical Code - 2011.

1.6 PROJECT CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.7 COORDINATION

A. Coordinate fuse ratings with HVAC and refrigeration equipment nameplate limitations of maximum fuse size.

PART 2 - PRODUCTS

2.1 FUSES

A. Manufacturers:

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- 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 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 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare fuse cabinets.

3.4 IDENTIFICATION

A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 26 28 13

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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

1. Molded-case circuit breakers (MCCBs).

B. Related Section

1. Section 26 05 53 "Identification for Electrical Systems".

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. 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.

B. Shop Drawings: For circuit breakers. Include plans, elevations, sections and details.

C. 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. 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.

1.5 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.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 -2008, by a qualified testing agency, and marked for intended location and application.

D. Comply with NFPA 70 -2008.

1.6 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

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Commissioner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Commissioner's written permission.
4. Comply with NFPA 70E -2008.

1.7 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:

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 Section 26 05 53 "Identification for Electrical System".

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.

B. Related Sections

1. Section 26 05 53 "Identification for Electrical Systems”.

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 enclosed switch, circuit breaker, accessory, and component indicated.

B. 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.

C. Field quality-control reports.

D. 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 - 2008, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70 -2008.

1.6 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers:

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: 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.

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:

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. Show pole quantities and voltage and ampere ratings of switches on Drawings.

C. 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.

D. 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:

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 Section 26 05 53 "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.

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.

B. Related Sections

1. Section 26 05 19 “Low-Voltage Electrical Power Conductors and Cables”.
2. Section 26 05 29 "Hangers and Supports for Electrical Systems".
3. Section 26 05 53 "Identification for Electrical Systems".

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 enclosed controller.

B. 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.

C. Field quality-control reports.

D. 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 - 2008, by testing agency, and marked for intended location and application.

C. Comply with NFPA 70 - 2008.

1.6 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.

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 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 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 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 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 20tripping 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 20tripping 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 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 Section 26 05 29 "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 Section 03 30 00 "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 Section 26 28 13 "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 Section 26 05 53 "Identification for Electrical Systems."

B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

C. Label each enclosure with engraved nameplate.

D. 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 Electrical 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.

END OF SECTION 26 29 13

SECTION 26 33 23 - CENTRAL BATTERY 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. Stored electrical energy, uninterruptible, emergency power supply system.

B. Related Sections
   1. Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables".
   2. Section 26 05 26 "Grounding and Bonding for Electrical Systems".
   3. Section 26 05 53 "Identification for Electrical Systems".

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Manufacturer Requirements

   1. The manufacturer must be ISO 9001:2008 “Quality Assurance Certified” and must upon request furnish certification documents.
   2. The manufacturer must have minimum three years experience in design and fabrication of centralized stored electrical energy emergency and standby power systems.

B. Product Data
   1. The manufacturer must supply documentation for the installation of the system, including wiring diagrams and cabinet outlines showing dimensions, weights, BTUs, input/output current, input/output connection locations and required clearances.
   2. Factory test results must be provided to show compliance with the requirements. The manufacturer must include battery test documentation which demonstrates compliance with the specified minimum emergency reserve with full rated KW load.
   3. The supplier must furnish three equipment submittal copies. Submittals must be specific for the equipment furnished and must include as-built information.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 REFERENCE STANDARDS

A. The system must be designed in accordance with applicable portions of the following standards:
   1. American National Standards Institute (ANSI C57.110)
   2. Institute of Electrical and Electronic Engineers (IEEE 519-1992) (C62.41-1991)
   3. National Electrical Manufacturers Association (NEMA PE-1)
   4. National Electric Code (NEC 2005, Article 700)
   5. National Fire Protection Association (NFPA 70) (NFPA 101) (NFPA 111)
   6. Underwriters Laboratories (UL 924)
   7. Federal Communications Commission (FCC Part 15, Sec. J, Class A)
   8. Federal Aviation Administration (FAA-G-201e)
   9. Listed UL Standards UL 924 Emergency Lighting Equipment with 90 minutes

1.7 WARRANTY

A. The manufacturer must guarantee all power component and system electronics to be free from defects in material and workmanship for a period of 2 years following substantital completion.

B. Battery warranty must be 1 year full replacement, 14 year prorated following substantial completion.

PART 2 - PRODUCTS

2.1 CENTRAL BATTERY EQUIPMENT MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Controlled Power Company.
   2. Core Power and Envoronment
   3. Power management Systems, inc.
   4. Or approved equal.

2.2 MANUFACTURED UNITS

A. Requirements
   1. The system as specified herein includes all the components required to deliver reliable, high quality uninterruptible power for emergency illumination and related life safety equipment.
   2. The system must incorporate an online, dual conversion, advanced DSP controlled, high frequency, IGBT PWM rectifier/charger and inverter, high speed automatic bypass transfer device, battery charging system, energy storage battery platform, a diagnostic

monitoring display panel, and all the related hardware components and software to facilitate a functional centralized system. The emergency power supply system must provide immunity from all line disturbances and power interruptions.

3. The system includes an uninterrupted, normally on output power section and a normally off standby output power section, thus enabling compatibility with emergency lighting fixtures operating in normally on and standby mode(s). A self-diagnostic monitoring alarm system continuously advises of system status and battery condition.

B. The system must be designed and manufactured to assure maximum reliability, serviceability and performance. All control devices and system electronics must be accessible via the front inverter cabinet for rapid service or replacement. The diagnostic monitor panel display must be mounted on the front of the system for easy observation of system status and battery condition. The system is to be furnished with an internally located AC input circuit breaker and up to 12 output circuit breakers as specified. The battery and DC conductors must be DC circuit breaker protected. All conductors and transformer windings must be copper constructed. The installed system must be floor mounted and wall secured, constructed of steel, with the inverter controls, bypass, and breakers being front accessible through a hinged door, requiring a hand tool for access. The installed inverter cabinet must be designed to meet NEMA 2 standards, rated for indoor use.

C. The system must operate in accordance with requirements as specified herein to support LED or HID fixtures or other approved loads up to the rating of the system. “Normally on” and “Normally off” AC output bus must be 100% rated and limited only by the system’s maximum KW output rating.

D. Normal Operation: The load is supplied with regulated power derived from the normal AC power input terminals through the rectifier charger and inverter. The rectifier charger must be fully rated to charge the batteries and supply sufficient DC energy for the inverter when under full load. The battery must be connected in parallel with the rectifier charger output.

E. Uninterrupted Emergency Operation: Upon the failure or unacceptable deviation of commercial AC power, energy will be supplied by the battery through the inverter and continue to supply power to the load without switching loss or disturbance. When power is restored at the AC input terminals of the system, the rectifier charger must continue to supply power to the load through the inverter and simultaneously recharge the batteries. There must be no break or interruption of power to the load upon failure or restoration of the commercial AC power.

F. Standby Emergency Operation: Upon the failure or unacceptable deviation of commercial AC power or upon a remote input “command on signal”, the standby, normally off AC output section of the system must become energized, thus providing emergency power for standby lighting fixtures which are required to illuminate only in the event of emergency. User-adjustable settings must include transfer on delay time (0 to 8 seconds), transfer off delay time (0 to 15 minutes), and a soft start control (0 to 172 cycles) to accommodate the high inrush current associated with energizing normally off emergency lights, compatible with various lighting types and manufacturers.

G. Automatic Bypass Operation: The system must include a high speed automatic bypass for fault clearing, for instantaneous overload conditions and/or to connect the load to the normal utility source in the event of a system rectifier charger or inverter failure.

H. Manual Bypass Switch: The system must include an integral inverter bypass switch for use in case of an inverter failure. The switch must be accessible via the front of the inverter enclosure, through a hinged door, requiring a hand tool for access. When in the bypass position, the switch must bypass the inverter power control electronics and divert utility power to the inverter's normally on output bus.

I. System Power Output Capability: The stored emergency power supply system output power rating must be 2000 watts.

J. Battery Time Reserve Capacity: Battery must be capable of producing emergency power for 90 minutes at full rated watts.

K. Reliability: MTBF 100,000 hours. MTTR, 1 hour typical.

L. System Input Breaker Rating: Input breaker must be sized to accommodate full rated load, low line input, and maximum recharge current simultaneously 2000 watt unit – 30A @ 120 VAC.

2.3 INPUT SPECIFICATIONS

A. Input Voltage: 120 VAC

B. Input Voltage Operating Range: +12% to -15% at full load without battery usage.

C. Extended Range: The unit must incorporate the use of variable range logic in conjunction with the load percentage to extend the input range up to +12% to -30%, without battery usage, while maintaining a regulated output voltage.

D. Frequency Range: 57.5 hertz to 62.5 hertz.

E. Power Factor: Self correcting to >0.97 (approaching unity).

F. Input Current Harmonics: <5% THD (total harmonic distortion).

G. System AIC (Amperes Interrupting Current) Rating: 10kAIC.

2.4 OUTPUT SPECIFICATIONS

A. Output Voltage: 120 VAC.

B. Sine Wave Voltage: Maximum 3% THD under linear load.

C. Frequency: 60 hertz + 0.5% under full load while in the battery operation mode.

D. Harmonic Attenuation: Reflected load generated harmonics must be attenuated at the input.

E. Voltage Regulation: +/-2%.

F. Output Power Rating: KVA at 1.0 power factor (unity). KVA = KW

2.5 BATTERY SPECIFICATIONS

A. Battery time: 90 Minutes at full rated kilowatt output, UL 924 listed Emergency Lighting Equipment

B. Battery Type: Integral, valve regulated, sealed lead calcium, maintenance free.

C. Charger: 4 stage, 400 watts, temperature compensated, smart charge.

D. Recharge Time: UL 924, NFPA 101 compliant, 24 hour recharge.

E. Bus Voltage: 72 VDC.

2.6 PERFORMANCE SPECIFICATIONS

A. Overload Rating (without use of static bypass): Up to 102% continuous, 125% for 30 cycles, 150% for 4 cycles when fed from the AC power source, or on battery.

B. LED Inrush Rating (without use of static bypass): Peak overload capability of 1200% during a current surge of ¼ cycle, when fed from the AC power source or on battery, to accommodate inrush current from LED fixtures/drivers.

C. Fault Clearing (with bypass available): 150% for 1 minute, 500% for 1 second, 1000% for 1 cycle.

D. Normally Off Bus Output with User-Progammable Soft-Start: Adjustable settings must be provided to limit the high inrush current, associated with energizing normally off emergency lights, to within the inverter's on battery overload rating.

E. Voltage Regulation: The output voltage must be regulated to within +2% during input voltage changes from +12% to -15% with reference to nominal, and when the output is loaded from no load to full rated load.

F. Reactive Power Correction: Load at 0.6 pF corrected to > 0.97 at input (automatically correcting).

G. Efficiency: 88% typical under full rated load.

H. Reliability: 100,000 hours MTBF.

2.7 ENVIRONMENTAL SPECIFICATIONS

A. Operating Temperature: 20°C to 35°C for UL 924 Listed models – Emergency Lighting Equipment. Optimum battery performance and life must be achieved at 25°C. Inverter electronics must be designed for use at 0°C to 40°C.

B. Inverter Storage Temperature: -20°C to 50°C.

C. Battery Storage Temperature: 25°C for 6 months. For each 9°C rise, reduce storage time by half.

D. Relative Humidity: 95% non-condensing.

E. Elevation: 5,000 feet, 1,500 meters.

F. Weight and Cabinet Sizes for UL 924 Listed models with 90 Minutes:

Rating / Voltage	Weight (lb.)	Dimensions W x D x H
2000 / 120 - 120	534	22” x 11.75” x 50”

G. Audible Noise Level: Not greater than 50 dba at 3 feet.

H. Enclosure: NEMA 2, powder-coat painted steel construction, drip-proof, and sealed prohibiting rodent entry.

2.8 DISPLAY MONITOR AND DIAGNOSTICS

A. Display Panel – System must include a local, front mounted, sealed, LED display panel to indicate system status and battery condition. Display must include provisions to automatically monitor inverter input voltage normal, inverter input voltage high, inverter input voltage low, inverter on automatic bypass, % load, battery in use, battery full charge, battery low and check battery.

B. Audible Alarm – The display panel includes an audible alarm with alarm silence for system on battery, low battery, check battery, over temperature warning, system fault and inverter overload.

C. Control Functions – Push button for inverter on, fail safe dual push buttons for inverter off, alarm silence push button and push button for manually initiating a system battery test.

D. Communications Port (RS232) – Include a DB9 and USB communications port for remote monitoring access to electrical measurements, system set point programming and system logs.

E. Electrical Measurements (RS232) – Electrical measurements must include: input voltage L1-neutral, output voltage L1-neutral, output current (amps), output watts, output volt amperes, % load, battery voltage and DC charging current, and output frequency.

F. System Set Points (RS232) – Include provision to program the following: low battery alarm, battery usage, automatic battery tests programmable for 30 day intervals, or 90 day intervals and an annual discharge test. The start date and time of the 30, or 90 day test selected and of the annual test (365 day interval) must be programmable via the RS232 connection (DB9 or USB port). The time duration of the automatic battery test must be programmable (30 seconds or 5 minutes).

G. System Log (RS232) – System must include provisions to log power outages, system overloads and battery test pass/fail results, all with a date and time stamp. Automatic Self-Testing – Systems must provide a programmable 5 minute automatic battery test that can be programmed to occur every 30, or 90 days.

2.9 RELAY COMMUNICATIONS INTERFACE

A. Status / Alarm relay interface normally open contacts must be provided for optional remote annunciator panel or automatic message dialer. Include potential free, 120 VAC @ .5amps, contacts for inverter on battery, low battery warning, and general alarm.

B. A normally closed Battery Test Active contact must be provided that opens during automatic or manual system testing. This contact must be used to signal one or more UL924 listed shunt relays to bypass local control devices during periodic and annual NFPA-mandated tests, in order to provide emergency power to designated emergency lighting fixtures.

2.10 SERVICEABILITY

A. The inverter's power section, including all control cards and system electronics, must be front-accessible and located behind a secure hinged access door for ease of service or component replacement. An integral inverter bypass switch must be provided. A DC circuit breaker and DC Anderson connector must be incorporated into the design to facilitate rapid replacement of the batteries via the front of the system enclosure. No side access must be required. To facilitate inverter diagnostics and programming, a DB9 and USB communications port must be provided for access to electrical measurements, system set points, and system logs.

2.11 ACCESSORIES

A. Include three control device (dimmer control, wall switch, occupancy sensor) override(s) for use with normally on inverter output bus to provide full illumination to designated emergency lights upon the failure or loss of commercial AC power.

B. Include one zone sensing device(s) to sense voltage at individual zone lighting panels. The sensing device must detect loss of power at the panel and must signal the system to illuminate emergency fixtures within the specific zone only. If commercial AC power is acceptable at other zones, emergency lighting must remain in the standby mode.

C. Include network device adapter for network communication of inverter system status, electrical measurement data, and automatic battery pass / fail test results with time and date stamp.

D. Include pre-installed, single pole, output circuit breakers
   1. 15 Amp (normally off) for emergency lighting
   2. 15 Amp, Switched output for exterior lightg (switched via photocell ot timeclock)
   3. 15 Amp (normally on) , continuously illuminated exit lighting

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance.

B. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment will be installed, before installation begins.

C. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install wall mounted system components. Do not attach directly to walls. Attach by bolting to steel channels.

B. Install floor mounted system components on concrete base and attach by bolting

C. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70 – 2008.

3.4 CONNECTIONS

A. Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams, unless otherwise indicated.

1. Provide wiring between unit and remote status monitoring panel.

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.C - 2008.

C. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.5 IDENTIFICATION

A. Identify equipment and components according to Section 26 05 53 "Identification for Electrical Systems."

3.6 STARTUP

A. Verify that central battery inverter is installed and connected according to the Contract Documents.

B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Complete installation and startup checks according to manufacturer's written instructions.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to instruct the facility's maintenance personnel to adjust, operate, and maintain central battery inverters.

END OF SECTION 26 33 23

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SECTION 26 43 13 – SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

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 field-mounted surge protection device for installation on low-voltage, 120 to 480 Volt power distribution equipment.

B. Related Sections:
   1. Section 26 05 19 "Low Voltage Electrical Power Conductors and Cables".
   2. Section 26 05 26 "Grounding and Bonding for Electrical Systems".

1.3 DEFINITIONS

A. ATS: Acceptance Testing Specifications.

B. SPD: Surge Protective Device(s), both singular and plural.

C. SVR: Suppressed voltage rating.

D. TVSS: Transient voltage surge suppressor(s), both singular and plural; also, transient voltage surge suppression.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

B. Verification that all SPD are UL tested and labeled with 20kA (In) nominal discharge rating for compliance to UL96A Lightning Protection Master Label and NFPA 780.

C. Product Certificates: For SPD devices, from manufacturer.

D. Field quality-control reports.

E. Warranties: Sample of special warranties.

F. Operation and Maintenance Data: For SPD devices 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, by UL and marked for intended location and application.

C. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.

D. Comply with NFPA 780.

E. Comply with NEMA LS 1.

F. Comply with UL 1449 and UL 1283 (Type 2 only).

G. Comply with NFPA 70.

H. Comply with FM Global requirements.

1.7 PROJECT CONDITIONS

A. Service Conditions: Rate SPD devices for continuous operation under the following conditions unless otherwise indicated:
   1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
   2. Operating Temperature: 30 to 120 deg F (0 to 50 deg C).
   3. Humidity: 0 to 85 percent, non-condensing.

1.8 COORDINATION

A. Coordinate location of field-mounted SPD devices to allow adequate clearances for maintenance, minimum 36” in front and 12” from centerline.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Ten years from date of substantial completion.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE AND TRANSFER SWITCH SUPPRESSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Current Technology Inc.; Danaher Power Solutions.
   2. Eaton Electrical Inc.
   3. Siemens Industry Inc.

4. Or Approved Equal

B. Surge Protection Devices Installed in new Service Entrance Substations:
1. Type 1, Complying with UL 1449, 3rd edition, with UL card.
2. SPD relying upon external or supplementary installed safety overcurrent protection do not meet the intent of this specification.
3. Arranged for copper bus bar connections to phase buses, neutral bus, and ground bus.
4. A three-pole circuit breaker for dedicated disconnecting means must be provided in the switchgear.
5. LED indicator lights for power and protection status.
6. Audible alarm, with silencing switch, to indicate when protection has failed.
7. Form-C contacts rated at 5 Amp and 250-VAC, one normally open and one normally closed. Contacts must reverse on failure of any surge diversion module or on opening of any current-limiting device.
8. Six-digit transient-event counter set to totalize transient surges.

C. Comply with UL 1283.

D. Minimum Surge Current Capacity Rating: 300 kA per phase.

E. Nominal discharge current (In): 20 kA.

F. Short circuit current rating (SCCR): 200 kA.

G. Maximum Continuous Operating Voltage (MCOV):

1. 480/277 V: 320 V.
2. 208/120 V: 150 V.

H. UL 1449 VPR for grounded wye circuits with 208Y/120 V, 3-phase, 4-wire circuits must be as follows:

1. Line to Neutral: 700 V for 208Y/120 V.
2. Line to Ground: 700 V for 208Y/120 V.
3. Neutral to Ground: 700 V for 208Y/120 V.
4. Line to Line: 1200 V for 208/120 V.

2.2 DISTRIBUTION SWITCHBOARDS AND PANELBOARD SUPPRESSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Current Technology Inc.
2. Eaton Electrical Inc.
3. Siemens Industry Inc.
4. Or approved equal.

B. Products must be installed external to new or existing distribution and branch panel equipment. SPD must have the same or greater AIC, Interrupting, or Fault rating of the equipment the SPD is protecting.

C. Surge Protection Devices:

1. Type 2, Comply with UL 1449, 3rd edition with UL card.
2. Externally mounted.
3. Short-circuit current rating complying with UL 1449, and matching or exceeding the equipment short-circuit rating and redundant suppression circuits; with individually fused metal-oxide varistors.
4. SPD relying upon external or supplementary installed safety overcurrent protection do not meet the intent of this specification.
5. Fabrication using bolted compression lugs for internal wiring.
6. An integral safety interlocked disconnect switch with an externally mounted manual operator.
7. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
8. LED indicator lights for power and protection status.
9. Audible alarm, with silencing switch, to indicate when protection has failed.
10. Form-C contacts rated at 5 Amp and 250-VAC, one normally open and one normally closed. Contacts must reverse on failure of any surge diversion module or on opening of any current-limiting device.
11. Six-digit transient-event counter set to totalize transient surges.

D. Comply with UL 1283.

E. Minimum Surge Current Capacity Rating:
1. LV switchgear, Switchboards, Distribution panels: minimum 200 kA.
2. Branch Circuit Panelboards: minimum 100 kA.

F. Nominal discharge current (In): 20 kA.

G. Short circuit current rating (SCCR): 200 kA

H. Maximum Continuous Operating Voltage (MCOV): 1. 480/277 V: 320 V.
1. 208/120 V: 150 V.

I. UL 1449 VPRfor grounded wye circuits with 2**08Y/120 V** 3-phase, 4-wire circuits must be as follows :
1. Line to Neutral:700 V for 208Y/120 V
2. Line to Ground: 700 V for 208Y/120 V.
3. Neutral to Ground: 700 V for 208Y/120 V.
4. Line to Line: 1200 V for 208/120 V.

2.3 ENCLOSURES

A. Indoor Enclosures: NEMA 250, Type 1.

B. Outdoor Enclosures: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION

A. Type 1 SPD devices at service entrance Secondary Unit Substations must be installed on the line side with ground lead bonded to service entrance ground.

B. Install Type 2 SPD devices for new or existing distribution switchgear, switchboards and panelboards externally with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
   1. Provide a three pole circuit breaker as a dedicated disconnecting means for each SPD unless otherwise indicated. Disconnecting means must occupy the first three spaces in existing equipment; adjust circuit-breaker positions to achieve shortest and straightest leads.
   2. Use crimped connectors and splices only. Wire nuts are unacceptable.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:
   1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
   2. After installing SPD devices but before electrical circuitry has been energized, test for compliance with requirements.
   3. Complete startup checks according to manufacturer's written instructions.

C. SPD device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports, submit to Commissioner.

3.4 STARTUP SERVICE

A. Do not energize or connect service entrance equipment, distribution equipment, or panelboards to their sources until SPD devices are installed and connected.

B. Do not perform insulation resistance tests of the distribution wiring equipment with the SPD installed. Disconnect before conducting insulation resistance tests and reconnect immediately after the testing is over.

3.5 DEMONSTRATION

A. Instruct the facility’s maintenance personnel to maintain SPD devices.

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SECTION 265000 - 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 SUMMARY

A. Section includes:

1. 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.

2. The work shall include but not be limited to the following:

a. Complete shop fabrication

b. Delivery to job site

c. Installation at designated locations, and controls as noted

d. Lamping and lamps

e. Lamp focusing

f. Cleaning and protection

3. Omissions: The City of New York shall not be held responsible for the omission or absence of any detail, construction feature, etc. which may be required in the production of the fixtures. The responsibility of accurately fabricating the fixtures to the fulfillment of this specification rests with the Contractor.

B. Related sections

1. Section 26 09 43 Network Lighting Controls

C. Reference standards

1. ASHRAE 90.1- 2013

2. NYCECC 2016

3. Leadership in Energy and Environmental Design (LEED)

4. New York City Building Code (and Reference Standards)

5. National Electrical Code

6. National Electrical Manufacturers Association (NEMA)

7. National Fire Protection Association (NFPA section 70)

8. American National Standards Institute (ANSI)
9. Illuminating Engineering Society (IES)
10. Aluminum Association (AA)
11. American Iron and Steel Institute (AISI)
12. Restriction of Hazardous Substances in LED (RoHS)
13. Certified Ballast Manufacturers Association (CBM)

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. The Contractor shall coordinate all aspects of the lighting fixture package and installation with the drawings and details of the Architectural, Structural, Electrical, Mechanical, and all other related trades.

B. No variation from the general arrangement and details indicated on the drawings shall be made in the submittal unless required to suit the actual conditions on the premises, and then only with the written approval of the Commissioner.

C. Submittal document(s) for all lighting fixtures shall be received no later than sixty days after award of Contract.

D. Review of shop drawings or samples does not waive contract requirements.

E. Provide manufacturer’s product data sheets for each type of lamp specified, including and highlighting the following product data:

1.5 SHOP DRAWINGS

A. Provide for each fixture type submitted clearly indicated and complete “fixture type specific” ordering code.

B. Narrative descriptions, cut sheets and verbatim copies of catalogue numbers, and submittals that do not include manufacturer’s current submittal sheets are not acceptable for review.

C. Catalogue cuts lacking sufficient detail to indicate compliance with contract documents will not be acceptable.

D. Manufacturer’s shop drawings

1. Must be provided for all fixture components.
2. Shop drawings should include:
   a. Details and cut sheets of each fixture type
   b. Clearly indicated fixture tag (Type designation)\
   c. Lamping / Lamps: details
   d. Power requirements (input voltage and wattage)

e. Power Supply Unit (PSU) details (when relevant)

f. Graphic diagrams of all major fixture components, with overall fixture dimensions, and all other relevant technical details (ex: housing construction, optics, lenses, accessories, baffles, method of support, power feed locations, gasketing, fixture and housing finish, and others.)

g. Contractor's field verified overall run lengths, layouts, and details that have been fully coordinated (with site conditions, construction by "others", etc.), when relevant.

   1) All non-standard layouts must be clearly documented, coordinated, and verified with field conditions, and any architectural integration as appropriate.

   2) Submit reflected ceiling plans, sections and/or details clearly identifying and locating each iteration of the fixture in the shop drawing

h. Any modified fixtures must be so noted and include Manufacturer's fabrication drawings and/or Manufacturer's statement demonstrating a clear understanding of the requirements and documentation of the product as it will be provided.

i. Photometric data.

   1) For all optical fixtures supply complete photometric data for the fixture, including optical performance rendered by independent testing laboratory, developed according to methods of Illuminating Engineering Society of North America

   2) Fixtures used for general illumination, photometric data shall include:

      a) Coefficients of utilization.

      b) Candlepower data:

         i) Presented graphically and numerically in 5-degree increments.

         ii) For all "up/down light" fixtures and fixture with asymmetrical light distribution, present additional values at normal, parallel, and at 22-1/2°, 45°, 167-1/2° to the fixture

      c) Zonal lumens stated numerically in 10-degree increments

   3) Area and roadway luminaires, photometric data shall include:

      a) Isocandela charts

j. LEED submittals:

   1) Mercury content per lamp (in mg)

   2) Mean light output (in lumens)

   3) Rated lamp life to failure or percentage of light output per number of hours (as appropriate to the Lamps)

   4) BUG rating

   5) Zonal lumen distribution

6) Custom fabrications shall clearly indicate the contract drawing number of fixture details used as reference in the development of the fixture, the name of the job, and of the Commissioner.

k. Indicate work to be provided by other trades

l. Indicate wiring and control circuits.

m. Indicate supplementary support when required by Building Code of New York and the IBC.

1.6 SAMPLES:

A. For final approval after initial qualifying shop drawing review, and prior to release for manufacturing, the Contractor shall furnish one sample of each fixture on the fixture schedule and contract drawings for which sample requirement is noted.

B. Shipping: The samples shall be complete with specified lamp(s), ready for hanging, energizing, and examining, and shall be shipped, prepaid by Contractor, 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.

1.7 CLOSE OUT SUBMITTALS

A. The Contractor shall be responsible for obtaining 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.

1.8 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. The Installer shall be a firm having trained personnel who have been in the business of installing specialty lighting for not less than three (3) years and shall provide a full-time field superintendent who shall be a representative of the installer during the installation and testing.

1.9 QUALIFICATIONS

A. The Manufacturer shall be a specialty lighting firm who has been in the business of designing and manufacturing specialty lighting fixtures for not less than three (3) years.

B. Ballast manufacturers shall have been producing electronic ballasts for at least three (3) years with a low failure rate.

1.10 WARRANTY

A. Warranties shall be provided in an acceptable form and shall be signed and notarized by a person or persons authorized to execute such a document on behalf of the company.

1. The Manufacturer shall guarantee all lighting fixtures and major components (except replaceable incandescent, halogen, and retro-fit LED lamps) for a period of three (3) years after substantial completion.

2. Drivers (for LED fixtures) shall carry five (5) year warranty, including labor.

1.11 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 Contract shall be furnished by the Contractor.

C. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.

D. Codes: Materials and installation shall be in accordance with the National Electrical Code and all applicable Federal, State, and local codes and regulations.

E. All fixtures and components of shall be manufactured in accordance with the appropriate and current requirements of a nationally recognized testing laboratory (UL, CUL, ETL, or others) and have appropriate labeling affixed to each fixture in a position that is concealed from normal view.

F. Specifications and scale drawings are intended to convey the salient features, function, and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary for the work.

G. Minor details, not usually indicated on the drawings nor specified, but that are necessary for the proper execution and completion of the fixtures, shall be included, the same as if they were herein specified or indicated on the drawings.

PART 2 – PRODUCTS

2.1 CATALOG NUMBERS

A. Catalog cuts or "Series" numbers are intended to establish the Manufacturer's product line only and are for design direction.

B. Contractor shall provide a fixture that meets the written performance and description, and that is coordinated with architectural and electrical drawings, and the field conditions.

2.2 CONTINUOUS FIXTURE RUNS

A. Continuous fixtures requiring multiple housings sections mounted in tandem, shall have no gaps between the individual housings or in the light output /uniformity. All joints must be flush, hairline-tight, without gaps or light leaks.

B. Contractor to coordinate "through wire" capability; if multiple points of entry / connection are required, they must be positioned in a manner and at locations that will not interfere with the continuous run length nor interrupt the light output. All fixtures with overall lengths of 8’-0” or less to be a single housing.

2.3 DISCREPANCIES

A. Any discrepancies between the catalog number, fixture description, and any other remarks within the Contract Documents, should be brought to the attention of the Project Commissioner prior to the release of a purchase order and/or fixture installation.

2.4 COORDINATION

A. Emergency Power

1. Contractor to coordinate quantity, location(s), type, method of connection (integral / remote), and provide all components necessary for a complete, fully functional, and code compliant installation.

2. Emergency lighting to be as defined in the electrical drawings within the Contract Documents. Contractor to coordinate quantity, location(s), type, method of connection to emergency power (integral / remote), and provide all components necessary for a complete, fully functional, and code compliant installation.

B. Ceiling Type and Construction

1. Fixture trim, mounting type (overlap flange / flush trim / or other) are to be coordinator by Contractor with the approved ceiling type and construction

C. Drivers: Sizes and Quantities

1. Quantity, type, and size of drivers required, length and type of factory-attached secondary power lead to the fixture (required, unless otherwise reviewed and approved by the manufacturer), and when necessary, method of connection to additional secondary cable (to be provided by the Contractor) are to be coordinated by the Contractor with the Fixture Manufacturer

D. Fixture Lengths

1. Fixture lengths and quantities to be coordinated by the contractor with the architectural drawings and field verified with as-built conditions. Bring to the attention of the design team any significant variances in lengths, or layouts

E. Power Connections

1. At all tandem mounted fixtures, all in-line power connection location(s), type(s) and the orientation of the connections are to be coordinated by the Contractor with the installation conditions so that housings butt with no gaps, or interruptions, assuring continuous light for full length of run.

F. Suspension

1. Method, quantity, location, and length of fixture suspension (rod, cable, or other) and power / control cables are to be coordinated by the Contractor.

2. When using rigid stem, Contractor to review the ability for field-cutting stem lengths; and if not possible, to coordinate required length(s) with architectural elevations and field conditions. Multiple lengths may be required within a single run and between adjacent fixtures mounted at the same height.

3. When the power supply / control signal cables are independent of the suspension method (i.e., suspension is by stainless steel aircraft cable), all cables must be from the location(s) indicated on the drawings (typically at the "rear" side of the space), request direction if absent. Include Manufacturer's cable guides; if not available, nylon tie fasteners (of the same color as the cable) should be used).

2.5 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. 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.

C. Housings shall be so constructed that all electrical components, including power supply units (ballasts / drivers) are easily accessible and replaceable without removing fixtures from their mountings, or disassembly of adjacent construction.

D. 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.

E. 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.

F. All fixtures shall be completely wired at the factory.

G. All fixtures supplied for recessing in suspended ceilings shall be supplied with prewired junction boxes.

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. There shall be no light leaks between ceiling trims of recessed lighting equipment and the ceiling. Fixture is used in partially transparent ceilings shall have no light leaks above the ceiling line.

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. Hardware:

1. Steel and aluminum fixtures: all screws, bolts, nuts and other fastening and latching hardware shall be cadmium or equivalent plated.

2. Stainless steel fixtures: all hardware shall be stainless steel.

3. Bronze fixtures: all hardware shall be stainless steel or bronze.

L. Temperature: All fixtures must operate within the temperature limits of their design and in the applications and mounting conditions herein specified.

M. Spread Lens Fixtures: Each light fixture which has a spread lens shall contain lens orientation locking devices to ensure that lens orientation is not disturbed during future lamp replacement or cleaning.

2.6 REFLECTORS

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.

2.7 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 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. 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.

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. 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. All lenses shall be turned over to the facility clean and free of dust.

2.8 LAMPS:

A. Manufacturer: Lamps shall be manufactured per specification (or approved equal.) All lamps of a given fixture designation and lamp type shall be supplied by the same manufacturer unless otherwise noted,

B. If a specific manufacturer is noted in the schedule, only that manufacturer shall be acceptable.

C. Provide lamps for all lighting fixtures (furnished as part of the electric work).

D. Incandescent, tungsten halogen, and LED retrofit lamps shall not be operated, other than for initial testing, prior to final inspection, lighting control programming and/or turnover of finished space to facility. If incandescent or tungsten halogen lamps are operated by the contractor during construction, all lamps must be replaced by the contractor prior to facility turn over.

2.9 LAMP HOLDERS:

A. Incandescent, tungsten halogen, and LED retrofit lamps:

1. Body: porcelain.

2. Screw Shell: nickel plated brass, pre-lubricated with silicone compound.

2.10 FINISHES

A. Painted Surfaces: Synthetic enamel, with acrylic, alkyd, epoxy, polyester, or polyurethane base, light stabilized, baked on at 350° Fahrenheit minimum, catalytically, or photo-chemically 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.

2.11 LED LIGHTING

A. Luminaire manufacturers shall only utilize LEDs that have been tested and comply with the relevant standards.

B. Testing shall be in accordance with

1. ASTME methods

2. IESNA current LM-79 standards by an independent DOE approved participating lab

C. LED chip manufacturers' recommended specifications shall be adhered to:

1. Power to the LEDs shall not be overdriven

2. Thermal characteristics of the luminaire coupled with the specified current shall not exceed acceptable temperature.

3. The fixture shall be designed to maintain LED junction temperatures below the specified maximum temperature.

D. All LED fixtures (100% of each lot) shall undergo a minimum eight-hour burn-in test during manufacturing.

E. LED color

1. Consistency for static white LEDs shall not exceed 3 SDCM (3 stem MacAdam binning)

2. CRI shall be at least 80 with an R9 value greater than (80) - unless otherwise specified on the fixture schedule.

3. The average color shift shall be less than 0.0026du'v' after 10,000 hours; 0.007du'v' after 60,000 hours (based on LM80)

F. Ambient temperature

1. An acceptable ambient operating temperature for all LED fixtures, at or below the manufacturer's recommendations, must be maintained at all times, including during storage (prior to installation), while in construction (including any time in an un-conditioned atmosphere), and continuously (after installation has been completed) until the project handover to the Owner.

G. Luminaire shall exhibit 50,000 hours of life to 70% lumen output (based on LM-80 and extrapolated via the TM-21 calculation from 9000 hours of data at the testing temperature - unless otherwise specified on the fixture schedule.)

2.12 EXTERIOR POLES

A. Exterior light pole, lighting fixture, and base/footer/bolt combinations are required to meet or exceeds the current AASHTO.

B. (American Association of State Highway & Transportation Officials) standards of EPA (effective projected area) ratings for steady wind x 1.3 standard gust factor for the geographical area in which the units are located. Manufacturer to provide fixture/pole EPA for verification.

2.13 FIXTURE LEGEND ON DRAWING SHEET

A. Fixture symbols and legend indicated on the architectural drawings are intended to provide assistance in establishing general type or category of lighting fixtures only. Refer to the Lighting Fixture Schedule for specific details of the indicated fixtures. Any discrepancies between the mounting condition and the written catalog number, fixture description, and remarks should be brought to the attention of the Commissioner prior to the release of a purchase order and/or fixture installation.

2.14 LENS UNIFORMITY

A. When a "uniformly Illuminated (white) diffuser" is specified, the diffuser must be uniformly illuminated for the full length of the run with no dark spots, fades in brightness, or similar inconsistencies - including across joints between tandem mounted lengths of fixtures; nor shall there be any "chip imaging (visibility)" through the diffuser. Power supplies to individual and tandem mounted fixtures should be located / oriented / positioned in a manner that will not interfere with the continuous line of light.

2.15 MODIFIED AND CUSTOM FIXTURES

A. Discrepancies / contradictions between fixture modification(s) and/or custom fixture fabrication drawing(s), description, and their specifications, with field conditions should be brought to the attention of the Project Commissioner prior to the release of a purchase order and/or fixture installation.

2.16 THEATRICAL LIGHTING EQUIPMENT

A. The Contractor is to provide all necessary components for a fully functional system, including, but not limited to all line voltage power and DMX control cabling, DMX splitters and terminators, interface(s), mounting hardware, and other devices as required.

B. Integration with the theatrical lighting system is required, and the BOM should be thoroughly reviewed by an authorized system integrator / theatrical supplier.

C. Programming assistance, to the extend deemed necessary by the system integrator (as coordinated with the theatrical system supplier), to assure that the system is properly configured and operational is required and should be provided as part of the theatrical lighting package.

2.17 INSTRUCTIONS

A. Each lighting fixture shall be packaged with complete instructions and illustrations showing how to install.

2.18 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 name, 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.

PART 3 – EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 GENERAL

A. Installation

1. 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.

2. Install each fixture properly and safely, fixtures in strict conformance with manufacturer's recommendations and instructions.

3. Appurtenances:

a. Furnish and erect hangers, rods, mounting brackets, supports, frames, and other equipment required.

b. 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.

4. 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.

5. Secondary voltages shall be tested at the power supply unit, the connection to the fixture, and such other locations on the distribution system as necessary. The inductance at the point of connection to the fixtures must be within the manufacturer’s allowable range.

6. 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.

7. Replace blemished, damaged or unsatisfactory fixtures as directed.

8. 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.

B. Control Wire for 0-10v dimming

1. The installation of low voltage control wire for fixtures utilizing a 0-10 volt protocol, requires the Contractor to have a thorough understanding of NEMA 410-2011, and IEC 60929. Control cable must run fixture - to - fixture; branch wiring (T-tapping) is not acceptable. Voltage drop should be kept to 0.3V or lower. Maximum digital wire loop length must not exceed the driver manufacturer's recommendations. Maximum number of drivers per loop must not exceed the driver manufacturer's recommendations. Polarity must be maintained throughout the installation, including at the connection to the driver (purple to +, grey to -). Other influences such as noise, inductances, and/or line voltage coupling must be accounted for. An incorrectly installed system will result in control errors and will not be acceptable.

C. Flush Trim Installation

1. Fixtures with a plaster edge and "flush" trim require that the manufacturer's installations must be followed exactly for an acceptable installation - Contractor must read and thoroughly understand the manufacture's installation requirements, and procedure prior to installation of the fixture. The bottom edge of the circular plaster ring must be flush with the finished ceiling surface. Housing / trim must be secured to ceiling suspension system with mechanized fasteners (screws), high heat adhesive (RTV), or per manufacturer’s directions to provide a “unitized" installation and prevent movement between the housing and ceiling; there should be no cracking at the aperture edge initially, nor over time. Allow sufficient plaster taper (so that there is apparent no bump at the aperture.) An incorrect installation will result in an unacceptable condition.

D. Focusing

1. Upon completion of construction, with all surface finishes complete, and FF&E (including any artwork and/or other accessories) in place, the Commissioner shall observe and direct the Contractor on the final targeting of all adjustable fixtures, including the installation / adjustment of any optical and/or mounting accessories. The labor after hours to complete this task, including the provision and/or coordinate of a lift, ladder and all other necessary equipment required to access the fixtures, and, the moving of furniture (as necessary), will be provided by the Contractor. Focusing may potentially be required after sunset; the Contractor will be responsible for all necessary coordination and accommodations.

E. Aiming and adjustment

1. All adjustable lighting units shall be aimed, focused, locked, etc., by the Subcontractor 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 setscrews and bolts and nuts shall be tightened securely.

2. Night Work: Where possible, units shall be focused during the normal working day. However, where daylight interferes with seeing, aiming shall be accomplished at night.

F. Cleanup

1. 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 replaced, and all lamps shall be operative.

G. Installation checkout

1. Upon completion of initial installation and fixture cleaning, the Contractor shall notify the Commissioner that the installation has been completed. At this time, the Contractor shall verify that the installation has been done in full accordance with the design and specification and is in full and complete working order.

3.3 LIGHT FIXTURE SCHEDULE

TYPE TA

1 Fixture: Recessed adjustable accent light with 40 deg beam spread, 3” aperture, frosted soft focus lens, 0.3"W x 0.06" thick micro-flange, finished baffle/cone trim, and integral dimmable driver. LED module & driver is field replaceable thru the aperture. Aiming angle is adjustable with hot aim mechanism, and lockable from below with 0° to 40° vertical tilt and 357° rotation. Fixture complete with Chicago plenum housing 3.5"T (above ceiling thickness) x7.5"W x 13.6"L, with collar of 0.46" and accepts ceilings of 0.5" - 1.375” thick. Fixture to be surrounded by fire-barrier, provided by other trades, where required in protected ceilings. **Driver to be verified with local and system controls prior to ordering. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer F3RM1A-FINISH*-AG*-90C14A-30-40-C-1-SG**-08, or comparable product from one of the following:

a. LF Illumination
b. USA Illumination
c. Flos
d. or approved equal

4 Lamps:

Watts	14w
Lumen	936lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: Integral

TYPE TA-1

1 Fixture: Same as type TA but with 85-degree optics, wide distribution lens & higher wattage/output. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer F3RM1A-FINISH*-AG*-90C19A-30-85-C-1-SG**-14, or comparable product from one of the following:

a. See type TA

4 Lamps:
Watts 21w
Lumen 1011lm
CCT 3000K
CRI 90+
Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: Integral

TYPE TA-2

1 Fixture: Same as type TA but higher wattage with 60 deg optics, soft focus lens & higher wattage/output. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer F3RM1A-FINISH*-AG*-90C19A-30-60-C-1-SG**, or comparable product from one of the following:

a. See type TA

4 Lamps:
Watts 21w
Lumen 1273lm
CCT 3000K
CRI 90+
Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TC

1 Fixture: Recessed wallwasher optic and angled lens, 3" aperture, 0.3"W x 0.06" thick micro-flange, finished baffle/cone trim, and integral dimmable driver. Supplied with suction tool to access housing from trim/aperture. LED module & driver is field replaceable thru the aperture. Aiming angle is adjustable with hot aim mechanism, and lockable from below with 0° to 40° vertical tilt and 357° rotation. Fixture complete with Chicago plenum housing 2.6"T (above ceiling thickness) x7.5"W x 13.4"L, with collar of 0.46" and accepts ceilings of 0.5" - 1.375" thick. Fixture to be surrounded by fire-barrier, provided by other trades, where required in protected ceilings. **Driver to be verified with local and system controls prior to ordering.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer F3RM1W-FINISH*-AG*-90C19A-30-WW-C-1-SG**, or comparable product from one of the following:

a. See type TA

4 Lamps:

Watts	16w
Lumen	1102lm
CCT	3000K
CRI	90+
Life	50000 hours

5 Control:0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TD

1 Fixture: Pipe mounted LED retrofit color changing wallwasher, complete with c-clamp for 2" nominal outer diameter theatrical pipe, 6' 120V black cord hardwired to black finished Jbox. Color changing wireless ethernet-controlled lamp is dynamic for 1400K–10,000K for fully saturated and pastel color ranges, finished black, with Edison-based socket adapter and very wide flood 60deg optics with 818 CBCP. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Edison Price Lighting MAX 38W - mod: C-clamp for 2" nominal outer diameter theatrical pipe-black finished 6ft cord-BLK with Ketra lamp CM-S38-11-I-BTVFL-11E26-BK or comparable product from one of the following:

a. LSI dynamic LED with pipe mount & phone app
b. Litelab dynamic LED with pipe mount & phone app
c. or approved equal

4 Lamps:

Watts	18w
Lumen	1100lm
CCT	1400K–10,000K

CRI 90+
Life 50000 hours, std L70

5 Control: dimmed Wireless, Low End 0.1%

6 Driver: integral

TYPE TE

1 Fixture: Wall mounted non-dimmable LED-retrofit lamped makeup lighting with metal lamp guards, medium base sockets spaced 9" O.C. Refer to elevation layouts in fixture cutsheets. *Lengths to be verified by Commissioner. Note: LED selected in lieu of standard halogen per LEED requirement.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Cole Lighting VS-9-WG-LENGTHS*-FINISH**, *Cellar: 9'-0", *3rd Floor: 4'-0", or comparable product from one of the following:

a. Belfer Lighting MQ
b. Starfire TT-MQ
c. Primus Lighting Reflection G LED
d. or approved equal

4 Lamps:
Watts 12w
Lumen 1000lm
CCT 2700K
CRI 90+
Life 25000 hours, std L70

5 Control: non-dim

TYPE TF

1 Fixture: Wall mounted LED non-dimmable 3000K "pilot" dressing room indicator light with round frosted lens & screwless white trim plate, approved for ADA. Fixture labeled to indicate space is in-use by performers; labeling nomenclature is to be determined.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Rich Brilliant Willing PAS-1W-PC31*-DD-30-120-non-dim-IP20, custom label; nomenclature TBV by Owner or comparable product from one of the following:

a. Deltalight LEDS C - with additional signage indicating
b. iGuzzini Cup - with additional sign indicator
c. iGuzzini Trick radial 1.75 semi recessed - additional sign
d. or approved equal

4 Lamps:
Watts 8.5w
Lumen 500lm
CCT 3000K
CRI 90+
Life 50000 hours, std L70

5 Control: non-dim

TYPE TG

1 Fixture: Surface mounted LED diffuse up/downlight boards with diffuse 2'-0" rolled opal lens for uniform lighting on all sides. 24% uplight for 960 lumens and 76% downlight for 3060 lumens with 86% optical efficiency. Fixture slightly suspended from ceiling to be 3.5" tall, with lens height of2.5".

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide XAL VELA EVO-RD-SUR-GR*-OP=30K-C90-UNV-010V-04000L-DM-2FT or comparable product from one of the following:

a. ALM Interlux ALM surface
b. Lumenwerx Pop core round direct indirect
c. Artemide Febe Ceiling
d. or approved equal

4 Lamps:
Watts 35w
Lumen 4020lm
CCT 3000K
CRI 90+
Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TH N O T U S E D

TYPE TI N O T U S E D

TYPE TJ

1 Fixture: Recessed LED steplight with lensed LEDs oriented in downlight position, complete with recessed mounting box/frame, blue tone gel and remote power supply. Faceplate has aperture of 1.7"T x 1.58"W with outer size of 2.75"T x 2.59"W. Contractor to coordinate back-box mounting per site conditions prior to issuing fixture submittal. Mounting collar 0.69"D x 2.4"W and size varies depending on option selected for seamless integration into wall finishes.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer ISL-1-BK*-80L02B-30-C: blue gel over lamp for use in theatrical space**, **Contractor to coordinate with Commissioner for gel #, SSL-RM Recessed specification pending wall type; surface mounted fixture available 0-10V dimmable power supply PSA-24V-40-1-L22 (powers up to 10 fixtures) or comparable product from one of the following:

a. Cole Lighting L157W
b. BK Lighting brickstar with blue gel
c. or approved equal

4 Lamps:

Watts 1.5w
Lumen 43lm
CCT blue
CRI 80+
Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: Remote PSU Req'd, Voltage SEC: 24 volts

TYPE TK

1 Fixture: Surface mounted LED accentlight with 25-degree optics, internal black baffle with seamless joint to fixture body, solite lens and hexcell louver complete with integral driver and concealed mounting plate. LED and driver assemblies are field replaceable. Cylinder is 4.9"T x 3.13"dia mounted on adjustable hinge to 1.6"T driver canopy for overall height of 6.8"T (at nadir). **Mounting condition to be verified in field. Note: lumen output includes hexcell louver. Focusing required.

2 Voltage:120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer CY2-AD-1-BK*-90C20A-30-25-CA2-2-4, CY2/3-JBMP** (for use with standard recessed j-box (not pancake), or comparable product from one of the following:

a. See type TA
b. USA Illumination mod-adj cylinder
c. or approved equal

4 Lamps:

Watts 24w
Lumen 1251lm
CCT 3000K
CRI 90+
Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TK-1

1 Fixture: Same as type TK but with frosted linear spread lens. Additional soft-focus lens provided at time of focus. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer CY2-AD-1-BK*-90C20A-30-25-CA2-7, CY2/3-JBMP (for use with standard recessed j-box (not pancake)**, SFL-CY2-03 soft focus lens***, or comparable product from one of the following:

a. See type TK

4 Lamps:

Watts	24w
Lumen	1251lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: Integral

TYPE TK-2

1 Fixture: Similar to type TK but lower wattage, with 60deg optics and frosted soft focus lens. **Mounting condition to be verified in field. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer CY2-AD-1-WH*-90C15A-30-60-CA2-6, CY2/3-JBMP (for use with standard recessed j-box (not pancake), or comparable product from one of the following:

a. See type TK

4 Lamps:

Watts	17w
Lumen	988lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TK-3

1 Fixture: Similar to type TK but with surface mounted finished j-box increasing height of fixture to 8.15" tall, with lower wattage, 40-degree beamspread, solite lens and hexcell louver. **Contractor to

surface mount finished manufacturer-supplied j- box & finish surface mount conduit. Organize conduit in neat and tidy method, confirming conduit run design with Commissioner. Finish conduit to match ceiling. **Mounting condition to be verified in field. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer CY2-AD-1-BK*-90C15A-30-40-CA2-2-4, CY2/3-CMJB-2I-1T-BK*-3/4 (finished surface mounted j-box with surface mounted conduit**), or comparable product from one of the following:

a. See type TK

4 Lamps:

Watts	17w
Lumen	926lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TL N O T U S E D

TYPE TM

1 Fixture: Basis of Design: Surface mounted 34" long linear LED with integral driver, recessed j-box and LED retrofit lamp. Housing is 2-7/16"deep (including lamp) x 1-9/16" wide x length specified. Conduit entry and butt-mount length vary with 'clean housings', tandem-mounted and single-module mounted, requiring contractor coordination. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-34-D-SM-CONFIGURATIONS-finish* MOD: wiring entry KOS (single or multiple sides, side and/or back)*** (uses Nippo lamp via Bartco: BNL6-34-30), or comparable product from one of the following:

a. Nippo	SAL-UWLED-850-M
b. Aamsco	Alinea
c. or approved equal	

4 Lamps:

Watts	12.7w
Lumen	1132lm
CCT	3000K
CRI	83
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TM-1

1 Fixture: Similar to type TM but finished standard black. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-50-D-SM-CONFIGURATIONS-BL MOD: wiring entry KOS (single or multiple sides, side and/or back)*** or comparable product from one of the following:

a. See type TM

4 Lamps:

Watts	12.7w
Lumen	1132lm
CCT	3000K
CRI	83
Life	50000 hours, std L70

5 Control:0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TM-2

1 Fixture: Same as type TM but finished white. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-34-D-SM-CONFIGURATIONS-finish* MOD: wiring entry KOS (single or multiple sides, side and/or back)*** or comparable product from one of the following:

a. see type TM

4 Lamps:

Watts	12.7w
Lumen	1132lm
CCT	3000K
CRI	83
Life	50000 hours, std L70

5 Control:0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TM-3

1 Fixture: Same as type TM but 40" long & finished white, concealed in architectural cove. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-40-D-SM-CONFIGURATIONS-white* MOD: wiring entry KOS (single or multiple sides, side and/or back)*** (uses Nippo lamp via Bartco: BNL6-40-30), or comparable product from one of the following:

a. see type TM

4 Lamps:

Watts	14.6w
Lumen	1334lm
CCT	3000K
CRI	83
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TM-4

1 Fixture: Same as type TM but 50" long & finished white. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-50-D-SM-CONFIGURATIONS-finish* MOD: wiring entry KOS (single or multiple sides, side and/or back)***, (uses Nippo lamp via Bartco: BNL6-50-30), or comparable product from one of the following:

a. see type TM

4 Lamps:

Watts	18.4w
Lumen	1720lm
CCT	3000K
CRI	83
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TM-5

1 Fixture: Same as type TM-2 but non-dim. ***Refer to architectural elevations.

2 Voltage: 120-277 universal

3 Basis-of-Design Product: Subject to compliance with requirements, provide Bartco Lighting BL6400-

34-D-SM-CONFIGURATIONS-finish* MOD: wiring entry KOS (single or multiple sides, side and/or back)***, or comparable product from one of the following:

a. see type TM

4 Lamps:
Watts 12.7w
Lumen 1132lm
CCT 3000K
CRI 83
Life 50000 hours, std L70

5 Control: non-dim

6 Driver: integral

TYPE TN N O T U S E D

TYPE TO N O T U S E D

TYPE TP N O T U S E D

TYPE TQ

1 Fixture: Wall mounted LED sconce, approved for ADA with integral dimmable driver (connected to non-dim circuit) complete with cast glass diffused & clear ruffled glass diffuser and finished anodized aluminum backing. Housing is 5.25" dia. x 3.2" depth.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Rich Brilliant Willing CR-S11-30-120-TR-IP20 or comparable product from one of the following:

a. Artemide Teti
b. Schoolhouse Polaris sconce with LED retrofit G25 90+ CRI
c. Schoolhouse U/1 sconce with LED retrofit " "
d. or approved equal

4 Lamps:
Watts 8.5w
Lumen 600lm
CCT 3000K
CRI 80+
Life 50000 hours, std L70

5 Control: non-dim

6 Driver: integral

7 Protection: IP20

TYPE TR N O T U S E D

TYPE TS

1 Fixture: Wall mounted LED sconce, with adjustable head to direct light from molded plastic lens, complete with integral driver in canopy. Housing is 5.5" diam. x 5" x 4.6".

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Rich Brilliant Willing MNT-FINISH*-30-120-NON-DIM or comparable product from one of the following:

a. Sattler	Avveni Single
b. Schoolhouse	Donna LED sconce
c. or approved equal	

4 Lamps:

Watts	8w
Lumen	600lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: non-dim

6 Driver: integral

TYPE TT

1 Fixture: Pendant mounted LED decorative fixture with cast glass diffuser and 21" diam. metal shade, 16ft. long field cuttable power cord, 5" diameter canopy, overall height of 7" and integral 0-10V driver. Field adjustment required with Commissioner.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Rich Brilliant Willing HP-21-FINISH-30-120-TM-IP20, power cord finish dark grey TBV by Commissioner, canopy finish dark grey TBV by Commissioner, or comparable product from one of the following:

a. Mooi	Non-Random-large-black
b. Marset	Scotch Club pendant
c. Shades of Light	Shaped Concrete Dome
d. Luceplan	Farel Pendant
e. AQ lighting	AQ-PS7586
f. or approved equal	

4 Lamps:

Watts	8.5w
Lumen	700lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TU NOT USED

TYPE TV N O T U S E D

TYPE TW

1 Fixture: Surface mounted linear lensed LED with local on/off concealed behind valence. Finish standard aluminum. **Length confirmed.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Luminii EL-120V-36**-30K-D, jumper cables, joiners and cords by Contractor for complete operable system or comparable product from one of the following:

a. LED-Linear
b. Optolum
c. Qtran
d. or approved equal

4 Lamps:

Watts	3.8w/linear foot
Lumen	318lm
CCT	3000K
CRI	90+
Life	50000 hours, std L70

5 Control: MLV-Fwd Ph, Low End 10%

6 Driver: integral

TYPE TX N O T U S E D

TYPE TY

1 Fixture: Canopy mounted LED accentlight pendant with 25-degree optics, with frosted linear spread lens, tiltable to 70deg from horizontal, complete with integral driver, mounting plate and field cuttable rigid stem. LED and driver assemblies are field replaceable. Body is 3.13"dia x 4.9"T with integral driver canopy of 1.6"T, for an overall luminaire height of 6.8" (without base canopy and stem), complete with 2"-43" stem length as per Commissioner & canopy 3.25" dia. x 0.6" thick. **Mounting condition to be verified in field. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide LuciferCD2-043-AD-1-BK*-90C15A-30-25-CA2-7-CMJB** or comparable product from one of the following:

a. See type TK

4 Lamps: Watts 24w
Lumen 1230lm
CCT 3000K
CRI 90+

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TZ

1 Fixture: Similar to type TY but fixed wallwash with angled lens. **Mounting condition to be verified in field.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lucifer CD2-043-WW-1-BK*-90C-20A-30-25-CA2-7-CMJB**, or comparable product from one of the following:

a. See type TK

4 Lamps: Watts 24w
Lumen 1230lm
CCT 3000K
CRI 90+

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral

TYPE TXA N O T U S E D

TYPE TXA-1 N O T U S E D

TYPE TXA-2

1 Fixture: Surface mounted LED wallwasher with wallwash optics, internal parallel-blade louver, corrosion resistant finish, remote power supply, aimable (adjustable mounting), jumper cables, half-frosted / half-clear tempered glass, IP66 rated, IK08 impact rated, mounted as two runs for both up/downlight in shared housing, separately circuited and 7" from wall. Each fixture 2-7/8"wide x 1.5"T x butt-mounted lengths. All visible components finished black. Focusing required.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide Lumenpulse LOGN-48V-30K-HFR-2W-LENGTH*-WW-MOUNTING**-BK-UCTL-CRC, LOGNRD - parallel blade louver, **WAMN6-modified TDA-for adjustable up & down fixtures in one finished bracket or comparable product from one of the following:

a. We-ef with mounting bracket described
b. Color Kinetics with mounting bracket described
c. Linea Light with mounting bracket described
d. or approved equal

4 Lamps:
- Watts 2w/linear foot
- CCT 3000K
- CRI 90+
- Life 50000 hours, std L70

5 Control: 0-10 volt (TVI), Low End 10%

6 Driver: integral, Voltage SEC: 48 VDC

7 Protection: IP66

TYPE TXB N O T U S E D

TYPE TXC N O T U S E D

TYPE TXD

1 Fixture: Canopy mounted LED sconce with shock resistant, tempered, clear glass and rated for wet location. Fixture dimensions are 2.25" in diameter by 7" tall with an adjustable knuckle base that is 1.625" tall.

2 Voltage: 120 volts

3 Basis-of-Design Product: Subject to compliance with requirements, provide BK Lighting DS-LED-e80-WFL-A9-*-12-11-A with PC-TRe20-FINISH*-1-VOLTAGE* power canopy or comparable product from one of the following:

a. Aurora
b. Hunza
c. or approved equal

4 Lamps:
- Watts 7w
- Lumen 409lm
- CCT 3000K
- CRI 80+
- Life 50000 hours, std L70

5 Control: MLV, 10% via onboard potentiometer

6 Driver: integral

7 Protection: Wet Location

END OF SECTION 265000

SECTION 27 05 00 - COMMON WORK RESULTS FOR COMMUNICATIONS

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. All work of Section 27 05 26 “Grounding and Bonding for Communications Systems”
2. All work of Section 27 05 29 “Hangers and Supports for Communications Systems”
3. All work of Section 27 05 53 “Identification for Communications Systems”
4. All work of Section 27 08 00 “Testing of Communications Systems”
5. All work of Section 27 11 16 “Communications Cabinets, Racks Frames and Enclosures”
6. All work of Section 27 11 19 “Communications Termination Blocks and Patch Panels”
7. All work of Section 27 11 23 “Communications Cable Management and Ladder Rack”
8. All work of Section 27 15 13 “Communications Copper Horizontal Cabling”
9. All work of Section 27 15 43 “Communications Faceplates and Connectors”
10. All work of Section 27 16 19 “Communications Patch Cords, Station Cords”

B. It is the intent of these Specifications to create an ANSI/TIA-942-A compliant cabling system to support high-speed data applications up to 100 Gbps including IEEE standards based on 1G, 10G, 40G, and 100 Gigabit Ethernet. System acceptance must be judged on its ability to perform as such, the successful adherence to the installation instructions of this Specification, and compliance with parts and workmanship warranties.

C. The work covered by this specification includes the installation of a complete cabling system, including all labor necessary to perform and complete such installation, all materials and equipment incorporated or to be incorporated in such installation, and all services, supervision, consumable items, fees, licenses, facilities, tools, and equipment necessary or used to perform and complete such installation.

D. Abbreviations and Acronyms

1. APC: Angled Polished Connector
2. BDF: Building Distribution Frame
3. BICSI: Building Industry Consulting Service International
4. CMP: Communications Plenum cable

5.	CMR:	Communications Riser cable
6.	DAS:	Distributed Antenna System
7.	ELFEXT:	Equal Level Far End Cross Talk
8.	ER:	Equipment Room
9.	F/UTP:	Foil Screened Unshielded Twisted Pair
10.	FOTP:	Fiber Optic Test Procedure
11.	GHz:	Gigahertz
12.	IDC:	Insulation Displacement Conductor
13.	IDF:	Intermediate Distribution Frame
14.	IT:	Information Technology
15.	ISP:	Inside Plant
16.	LC:	A type of small form factor optical fiber connector
17.	LOMMF:	Laser Optimized Multimode Fiber
18.	MDF:	Main Distribution Frame
19.	MHz:	Megahertz
20.	MMF:	Multimode Fiber
21.	MPO:	Multi-fiber Push On connector
22.	MPOE:	Minimum Point of Entry
23.	NEXT:	Near End Cross Talk
24.	OFNP:	Optical Fiber nonconductive plenum cable
25.	OFNR:	Optical Fiber nonconductive riser cable
26.	OSP:	Outside Plant
27.	OTDR:	Optical Time Domain Reflectometer
28.	PoE:	Power-over-Ethernet
29.	PSELFEXT:	Power Sum Equal Level Far End Cross Talk
30.	PSNEXT:	Power Sum Near End Cross Talk
31.	RCDD:	Registered Communications Distribution Designer
32.	RMU:	Rack Mount Unit
33.	RoHS:	Restriction of Hazardous Substances
34.	ScTP:	Screened Twisted Pair
35.	STP:	Shielded Twisted Pair
36.	SMF:	Single mode Fiber
37.	TBB:	Telecommunications Bonding Backbone
38.	TCIM:	Telecommunication Cabling Installation Manual
39.	TDMM:	Telecommunications Distribution Methods Manual
40.	TDR:	Time Domain Reflectometer
41.	TGB:	Telecommunications Grounding Busbar
42.	TIA:	Telecommunications Industry Association
43.	TMGB:	Telecommunications Main Grounding Busbar
44.	TR:	Telecommunications Room
45.	TSER:	Telecommunications Service Entry Room
46.	UL:	Underwriters Laboratory
47.	UTP:	Unshielded Twisted Pair
48.	WAP:	Wireless Access Point

E. "Wiring" or "Cabling" includes furnishing, unless otherwise noted, of all fittings, hangers, supports, sleeves, etc.

F. "Conduit" and Cable Tray" includes furnishing, unless otherwise noted, of all fittings, hangers, supports, sleeves, etc.

G. "Concealed" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings.

H. "Exposed" means not installed underground or "Concealed" as defined above.

I. “Permanent Link” means the end-to-end test configuration for a link excluding test cords and patch cords, but including the mated connection with the link.

1.3 CODES, REGULATIONS, AND STANDARDS

A. All equipment must be equal to or exceed the minimum requirements of OSHA, NEMA, IEEE, ASME, ANSI, NEC and Underwriters Laboratories.

B. Local electrical and building codes in New York may be more stringent than national codes, recommendations or practice. Follow the most restrictive code or recommendations.

C. All products, services and materials provided and performed under the scope of this specification must conform to the following codes and standards. Refer to the most recent version, update or addenda.

1. Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual - latest edition
2. Building Industry Consulting Service International (BICSI) Information Transport Systems Installation Manual (ITSIM) – latest edition
3. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard
4. ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard
5. ANSI/TIA-569-C, Telecommunications Pathways and Spaces
6. ANSI/TIA-606-B, Administration Standard for Telecommunications Infrastructure
7. ANSI/TIA-607-B, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
8. ANSI/TIA-942-A, Telecommunications Infrastructure Standard for Data Centers
9. ANSI/TIA-455-57-B, FOTP-57, Preparation and Examination of Optical Fiber End Face for Testing Purposes
10. ANSI/TIA-455-78-B FOTP-78, Measurement Methods and Test Procedures – Attenuation
11. ANSI/TIA-455-95-A FOTP-95, Absolute Optical Power Testing for Optical Fiber and Cables
12. ANSI/TIA-455-133-A FOTP-133, Measurement Methods and Test Procedures – Length Measurement

13. ANSI/TIA-492AAAC-A, Detail specification for 850 nm Laser-Optimized, 50-µm Core Diameter/125-µm Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
14. ANSI/TIA-492CAAB, Detail Specification for Class lVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak
15. ANSI/TIA-526-7, OFSTP-7, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
16. ANSI/TIA-526-14-B, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant
17. ANSI/TIA-758-B Customer Owned Outside Plant Telecommunications Infrastructure Standard
18. FCC Part 15
19. FCC Part 68
20. IEEE 802.3-2012
21. IEEE 802.11, Wireless Ethernet Specifications, including 802.11a, 802.11b, 802.11g and 802.11n.
22. NEC Article 392.5, Construction Specifications for Tray Modification
23. NEC Article 770, Optical Fiber Cables
24. NEC Article 800, Communications Circuits
25. NFPA 70, National Electrical Code
26. NFPA 75, Protection of Electronic Computer / Data Processing Equipment

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. All materials furnished must be new, unused, clean and free from damage, defects or corrosion.

C. Equipment and materials of the same type must be a product of the same manufacturer throughout unless specifically exempted in advance. A specific example is all products comprising the Permanent Link (station cable, patch panels, jacks, faceplates, etc.…)

D. Component manufacturer must be ISO 9001:2008 and offer products that are RoHS compliant.

1.5 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Certificates:

1. Submit management and installation team reference documentation verifying that:
   a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has experience managing similar projects in size and scope. The documentation must include the RCDD registration number.

b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents.

C. Qualification Statements

1. The contractor must submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been properly trained by the manufacturer of the products they are installing.

1.6 PROJECT CLOSEOUT

A. Subsequent to the installation and prior to acceptance of the work, the contractor must prepare and issue record (as-built) drawings, in AutoCAD 2010 format, that reflect the lengths of cables installed, the actual manner and conditions of installation, including all deletions from, additions to or departures from the contract documents. These documents are to include all specified labeling and pathway routing detail. Pathway routing detail must be provided in excel format for importation into the facility's database. Identifiers used to label cables and components as specified in Section 270553 must be used in identifying cables and components in record drawings.

B. Provide revised cable termination schedules for all cables installed under the Work. Format to comply with the facility's system requirements. Schedules must be in printed form and on either CD, DVD, USB in Microsoft Excel format. Identifiers used to label cables as specified in Section 270553 must be used in identifying cables in cable termination schedules.

C. Provide two (2) sets of Operation and Maintenance Manuals including wiring diagrams, parts list, shop drawings and manufacturers' information on all equipment and cables provided under this Work. Provide manuals in a high quality, 3-ring binder, completely indexed. Provide manuals within fifteen days of systems acceptance

D. Provide two (2) sets of all cable test results in the native format of the test equipment vendor and in excel format on CD, DVD or USB. Identifiers used to label cables as specified in Section 270553 must be used in identifying cables in cable test results

1.7 MANUFACTURER'S WARRANTIES

A. Upon substantial completion, the contractor must coordinate with the manufacturer the issuance of a full warranty on the entire copper and fiber optic cable plant for both parts and labor, for a period of no less than 20 years.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXECUTION REQUIRMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 STAFFING

A. Craft personnel must be certified personnel qualified to perform the work and be knowledgeable of the following activities included but not limited to:

1. Color coding of standard American telephone/ data telecommunications cables.
2. Bonding and grounding of telecommunications systems
3. Testing conductors for transmission impairments.
4. Testing conductor insulation.
5. Installation and termination of optical fiber cabling.
6. Testing and verification of optical fiber transmission characteristics with a power meter.
7. Telephone and data industry cable installation standards and manufacturer's instructions will be used for in-process quality control and final acceptance of the work installation.
8. Cable tray and ladder rack installation.

B. Craft personnel will be required to provide and use the proper tools and test equipment in the performance of each activity. The tools must be in good working order, and the test equipment must have current calibration certificates, as applicable. The Commissioner reserves the right to review the tool and test equipment lists and maintenance procedures of the contractor.

C. Follow manufacturer's instructions for installing, connecting, and adjusting all telecommunications cabling and associated supporting, termination and splicing equipment, conduits, poke through, and cable tray. Provide a copy of such instructions at the equipment during any work on the equipment.

D. Keep all items protected before and after installation. Provide protection for exposed cables roughed onto the floor prior to their installation into the furniture systems. Clean up and remove all debris.

E. If products and materials are specified herein for a specific item or system, use those products or materials. If products and materials are not listed, use first-class products and materials, subject to acceptance of shop drawings.

F. Examine and compare the telecommunications cabling drawings and specifications with the drawings and specifications of other trades; report any discrepancies between them to the Commissioner; and obtain written instructions for changes necessary in the work.

G. The locations of structural and architectural features, sleeves, floor slots, termination and cross connect fields, panels, racks and other equipment indicated on the drawings are approximate. The contractor must verify the existence, locations, and suitability of all such items, and must present required modifications to contract documents necessary to complete this work.

3.3 SPECIAL CONDITIONS

A. Furnish, install, terminate and test all riser & tie cabling shown in the attached and associated drawings and described below.

1. The contractor must route all copper and fiber cabling, unless otherwise identified, via overhead cable tray, ladder rack, conduits, raised floors, and poke-through unless otherwise noted
2. Cables with the same origin and destination must take diverse paths. Diverse path is defined as paths that do not intersect and remain at least 3 feet apart along the entire route
3. All cables must be dressed in a neat manner, observing cable bend radius limit at each rack, frame and cabinet, and on ladder racks and cable trays.
4. Overhead cabling must follow tiered cable tray system. Utilize cable waterfall for exiting ladder rack at frames and cabinets.
5. Provide Velcro cable ties at five-foot intervals for each cable bundle.
6. Provide pedestal mount J hooks for supporting cables from under floor cable tray to cabinet or frame
7. Cables must be securely bundled, but may not display insulation/sheath damage or pair distortion from over-tightening of Velcro cable ties
8. Cabling at racks and frames must be neatly dressed and Velcro tie wrapped.
9. Fiber cabling at fiber distribution frame must be secured to frame with cable clamps.

3.4 INSTALLATION

A. Subcontractor will provide paired copper, coaxial, and optical fiber backbone and horizontal cabling as noted on Drawings and Schedules.

B. Take all necessary precautions to assure that the maximum tensile load and minimum bend radius of all cables (fiber and copper) are not exceeded. When terminating UTP cable, maintain pair twists up to the termination point and the cable sheath must not be removed more than 0.5” from the termination point. Velcro tie wraps are to be hand tightened on cables to prevent crimping cable sheath. Plastic tie wraps are not to be used on lateral cables. All tie wraps need to be cut so that no edges are visible that can cause potential damage to the cable bundle. The contractor is responsible for protecting all connectorized cables from damage by other contractors at the information outlet before and after installation of the outlet faceplates

C. Termination Hardware.

1. All copper and fiber cabling will be terminated on rack and cabinet mounted patch panels. The fiber optic tie cabling must be terminated on fiber distribution coupler panels

with LC connectors. All termination hardware must be grounded and bonded according to applicable codes, TIA standards, and Section 270526.

3.5 REPLACEMENT

A. Any fiber strand, connector, block, or module installed by the contractor, which fails to meet the loss budget or tests below the manufacturer's standards, must be replaced at no additional cost to The City of New York. The replacement cable, connector, or part must be tested after repairs have been made to verify compliance. Only equipment that meets the installation requirements stated herein must meet The City of New York's acceptance requirements.

3.6 SOURCE MANUFACTURING AND QUALITY CONTROL

A. Cables that are supplied by the contractor, and test outside of the factory test data by a margin of 10 percent on loss, may, at the Commissioner's option, be deemed non-usable and returned to the manufacturer for replacement.

3.7 POST IMPLEMENTATION TESTING

A. Following the physical installation of the cabling, the contractor will conduct pre-checkout tests as described below, "Physical Inspection", prior to the formal acceptance tests with the Commissioner.

3.8 PHYSICAL INSPECTION

A. Prior to conducting any transmission testing, the following visual inspections will be performed:

1. Verify that all cable has been installed to full compliance with the proposal specifications.
2. Check for physical damage to the optical fiber distribution panels and termination hardware.
3. Check that all cabling is properly jacketed, installation properly labeled at both ends of the cable, innerduct and termination hardware is completed.
4. Verify that all cable bends are within the manufacturer's specified bend radius
5. Verify that the cables are properly approved and structurally supported for termination

END OF SECTION 27 05 00

SECTION 27 05 26 - GROUNDING AND BONDING FOR COMMUNICATIONS 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. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Busbar
2. Ground Conductors
3. Ground Lugs

B. This section includes the minimum requirements for grounding, Earthing, and bonding of equipment and cable installations installed under or referred to in Division 27 Contract Documents.

C. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 11 16 ”Communications Cabinets, Racks, Frames, and Enclosures”
3. Section 27 11 19 “Communications Termination Blocks and Patch Panels”
4. Section 27 11 23 “Communications Cable Management and Ladder Rack”

1.3 SUBMITTAL PROCEDUES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.5 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 WALL-MOUNT BUSBARS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Chatsworth Products or comparable product by one of the following:

1. B-Line Products
2. Hi-Tech Fasteners, Inc.
3. Or approved equivalent

B. Telecommunications Main Grounding Busbar (TMGB)

1. Telecommunications Main Grounding Busbar (TMGB) must be constructed of .25” (6.4 mm) thick solid copper bar.
2. The busbar must be 4” (100 mm) high and 20” (510 mm) long and must have 30 attachment points (two rows of 15 each) for two-hole grounding lugs.
3. The hole pattern for attaching grounding lugs must meet the requirements of ANSI/TIA – 607-B and must accept 27 lugs with 5/8” (15.8 mm) hole centers and 3 lugs with 1” (25.4) mm) hole centers.
4. The busbar must include wall-mount stand-off brackets, assembly screws and insulators creating a 4” (100 mm) standoff from the wall.
5. The busbar must be UL Listed as grounding and bonding equipment

C. Telecommunications Grounding Busbar (TGB)

1. Telecommunications Grounding Busbar (TGB) must be constructed of .25” (6.4 mm) thick solid copper bar.
2. The busbar must be 4” (100 mm) high and 20” (510 mm) long and must have 30 attachment points (two rows of 15 each) for two-hole grounding lugs.
3. The hole pattern for attaching grounding lugs must meet the requirements of ANSI/TIA – 607-B and must accept 27 lugs with 5/8” (15.8 mm) hole centers and 3 lugs with 1” (25.4) mm) hole centers.
4. The busbar must include wall-mount stand-off brackets, assembly screws and insulators creating a 4” (100 mm) standoff from the wall.
5. The busbar must be UL Listed as grounding and bonding equipment.

2.2 BONDING ACCESSORIES

A. Two Mounting Hole Ground Terminal Block

1. Ground terminal block must be made of electroplated tin aluminum extrusion.
2. Ground terminal block must accept conductors ranging from #14 AWG through 2/0.
3. The conductors must be held in place by two stainless steel set screws.
4. Ground terminal block must have two 1/4” (6.4 mm) holes spaced on 5/8” (15.8 mm) centers to allow secure two-bolt attachment to the rack or cabinet.
5. Ground terminal block must be UL Listed as a wire connector.

B. Compression Lugs

1. Compression lugs must be manufactured from electroplated tinned copper.
2. Compression lugs must have two holes spaced on 5/8” (15.8 mm) or 1” (25.4 mm) centers, as stated below, to allow secure two bolt connections to busbar.
3. Compression lugs must be sized to fit a specific size conductor, sizes #6 to 4/0, as stated below.
4. Compression lugs must be UL Listed as wire connectors.

C. Antioxidant Joint Compound

1. Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.

D. Equipment Ground Jumper Kit

1. Kit includes one 610 mm L insulated ground jumper with a straight two-hole compression lug on one end and an L-shaped two-hole compression lug on the other end, two plated installation screws, an abrasive pad and a tube of antioxidant joint compound.
2. Ground conductor is an insulated green/yellow stripe #6 AWG wire
3. Lugs are made from electroplated tinned copper and have two mounting holes spaces 12 mm to 16 mm apart that accept 6 mm screws.
4. Jumper will be made with UL Listed components

E. Accessory Products:

1. Provide any accessory products related to the copper connectors required to provide a complete and functional infrastructure system.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

B. Confirm all housings including back boxes, floor boxes and poke-through provided for the telecommunications connectivity system will support the installation of project approved manufacturer components prior to purchase of the components described in this specification.

3.3 INSTALLATION

A. General Installation Practices

1. Installation and testing of the telecommunications bonding and grounding infrastructure must follow the specifications and recommendations of ANSI/TIA-607-B Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises and ANSI/NECA/BICSI-607 Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

B. Grounding Hardware

1. The grounding and bonding infrastructure system must not make use of the building plumbing system, unless required to do so by the NEC.
2. Coordinate the installation of the grounding and bonding system with the electrical power distribution system grounding infrastructure
3. TGB: Provide TGBs as shown in the Contract Documents including the ER, MDF, IDF, TRs, POE rooms, and additional technology rooms as specified in ANSI/TIA-607-B. Directly bond each TGB to its associated TBB and to the nearest building structural steel or other permanent metallic system. Group protector, busbar bonding, and approved building grounding conductors toward the left end and leave space for equipment grounding conductors to the right end.
4. TBB(s) and Grounding Conductors: Provide TBB(s) and grounding conductors as shown on the Contract Documents and as required to bond all non-current carrying metal telecommunications equipment and materials to the nearest TGB. Use TBB(s) to connect the TMGB to each TGB. Route along the shortest and straightest path possible with minimal bends. Bends must be sweeping. Insulate TBB(s) and conductors from their support. TBB(s) and grounding conductors must be continuous (without splices).
5. Ensure that bonding breaks through paint to bare metallic surface of all painted metallic hardware.
6. Labeling:
    a. Label the TMGB, TGB, TBBs, and bonding conductors as specified in ANSI/TIA-606-B
    b. Label TBB(s) and bonding conductors “Warning! Telecommunications Bonding Conductor. Do Not Remove Or Disconnect!”

C. Wall-Mount Busbar

1. Process
   a. Conductor connections to the TMGB or TGB must be made with 2-Hole Bolt-On Compression Lugs sized to fit the busbar and the conductors.
   b. Each lug must be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
   c. The wall-mount busbar must be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

D. Cable Tray and Ladder Rack (cable runway)

1. Process:
   a. Follow manufacturer's instructions for grounding, use wherever possible use grounding hardware and accessories from same manufacturer as cable tray and cable runway systems

E. Frames & Cabinets

1. Process:

   a. Contractor to follow frame/cabinet manufacturer's instructions specific to grounding. Use grounding hardware and accessories from same manufacturer.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 05 26

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SECTION 27 05 29 - HANGERS AND SUPPORTS FOR COMMUNICATIONS 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 DESCRIPTION OF WORK

A. Section Includes:

1. Non-continuous cable supports.

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 36 “Cable Trays for Communications Systems”
3. Section 27 11 16 “Communications Cabinets, Racks, Frames, and Enclosures”
4. Section 27 11 23 “Communications Cable Management and Ladder Rack”
5. Section 27 15 13 “Communications Copper Horizontal Cabling”

1.3 SUMMARY

A. Provides specifications for non-continuous cable support components utilized to provide pathways support to telecommunications cables traveling outside cable trays, conduits, or other continuous cable supports.

1.4 REFERENCES

A. Codes and Regulations:

1. Refer to Section 270500 – Common Work Results for Communications

1.5 SUBMITTALS

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 NON-CONTINUOUS CABLE SUPPORTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Erico – Caddy CableCat Support System or comparable product by one of the following:

1. Cooper B-Line – Spring Steel Fasteners
2. Panduit – J Mod Cable Support System
3. Or Approved Equivalent

B. Product Options:

1. Select support system components capable of supporting the telecommunications cable quantities required for each location. Options are as follows:
   a. Support slings/cable straps
   b. Four (4) inch wide J-hook supports wide base cable support J-hooks equivalent.

C. Description:

1. Non-continuous cable supports must be available in multiple sizes, styles and materials. Rigid supports must be equipped with flared edges and pre-configured bend radius controls.
2. Provide drop wire supports and threaded rod assemblies in areas where structural mounting surfaces are non-functional or inaccessible.
3. Sling assemblies'/cable straps must provide a bearing surface of sufficient width to comply with required bend radii of high-performance UTP cables. Support slings must have a static load limit of 100 lbs.
4. Non-continuous cable supports sized 1 5/16" and larger must have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap must be removable and reusable.
5. Select approved non-continuous cable supports suitable for specific installation environments and/or air handling (plenum) spaces.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

3.3 NON-CONTINUOUS CABLE SUPPORT INSTALLATION

A. Process:

1. Follow manufacturer's instructions and recommended industry standards and guidelines.
2. The installed non-continuous support system must be an independent support structure for the voice/data communication system.
3. Draping cables over other structures in the ceiling is unacceptable. Water pipes, ceiling grid, sprinkler system, electrical supports, air ducts or any other in-ceiling structure may not be used for cable support.
4. Contractor installed supports must be used to supplement the main cable support system when any cabling leaves the main support system or is unsupported for more than three and one half feet (3'-6").
5. Supports must be installed at a maximum distance of 5'-0"apart.
6. Non-continuous supports must be installed with ceiling wire or threaded rod secured to the slab above to support the telecommunications cable infrastructure parallel to the slab throughout the cable plant, unless site conditions dictate a non-parallel installation.
7. Cable must be routed to follow existing corridors and parallel or 90 degree angles from all walls and the cable tray whenever possible.

3.4 RE-INSTALLATION

A. No additional burden to the City of New York regarding costs, network down-time, and end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning any re-installation work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 05 29

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SECTION 27 05 53 – IDENTIFICATION FOR COMMUNICATIONS 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. Labeling and identification products for the communications systems.

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 11 16 “Communications Cabinets, Racks, Frames, and Enclosures”
3. Section 27 11 19 “Communications Termination Blocks and Patch Panels”
4. Section 27 11 23 “Communications Cable Management & Ladder Rack”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to Section 27 05 00 “Common Work Results for Communications”

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 LABELING AND IDENTIFICATION PRODUCTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Brady USA Inc., or comparable product by one of the following

1. Panduit Corporation
2. Rhino
3. Or approved equivalent

B. Description:

1. Machine-generated, printed self-adhesive, smudge resistant labels for cables, faceplates, patch panels, and termination blocks. Labels must be appropriately sized for cable diameter. Labels must be appropriately colored for faceplate color contrast
2. The intention of the labeling scheme is to be ANSI/TIA-606-B compliant.
3. It is the responsibility of the contractor to acquire, understand, and utilize the facility’s labeling scheme for all components of the communications system.
4. Submit sample labels for approval.
5. Labels must have industrial adhesives that resist dirt and oil.
6. Must have a split backing for easy removal
7. Design Make
    a. Flexible Nylon
        i. For curved surfaces (wire and cable) and rough surfaces for indoor applications flexible nylon memory resistant material must be used.
    b. Permanent Polyester Labels
        i. For flat surfaces permanent polyester must be used.
    c. Vinyl
        i. For outdoor applications in direct sunlight and where color coding is required vinyl must be used.
    d. Heat Shrink Tube
        i. Must be polyolefin tube with a 3:1 heat-shrink ratio
    e. Non – Adhesive labels
        i. Must be rigid and durable polypropylene material.
8. Labeling must meet the visibility and durability requirements of ANSI/TIA – 606-B standard.
9. Labels must be pre-printed or laser-printed. Hand written labels are not acceptable.
10. Labels must have white printing area and black print. If cable jacket is white, provide cable label with printing area that is any color other than white, preferably orange or yellow – so that labels are easily distinguishable

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

3.3 LABELING

A. Process:

1. The Commissioner-approved labeling scheme is intended to comply with the ANSI/TIA-606-B standard for labeling and administration of a cable plant. It is the responsibility of the contractor to acquire, understand, and utilize the facility's labeling scheme for all component of the Voice, Data Communications system including, but not limited to:
   a. Tie cables (both ends and on each floor of an exposed cable run, such as within an Equipment Room or MDF Room)
   b. Termination panels, blocks, trays
   c. MDF entry and exit pathways
   d. Racks, Cabinets and Equipment
   e. Telecommunication cable tray, conduit pathways, & pullboxes
   f. Telecommunications grounding & bonding system

2. Contractor to provide labels as described herein for all conduits, manholes, and pullboxes at all interconnecting points as well as conduit ends as shown on the drawings.
   a. All labels must include 'From-To' information clearly stated.

3. Label each component with a machine-generated label where it is accessible for administration.
4. Provide on all termination blocks installed under this Work, machine-generated designation strips with the cable ID clearly printed and pair number, in uppercase lettering.
5. Provide on all patch panels installed under this Work, machine-generated label with the cable ID and port number clearly printed in uppercase lettering. Each panel must have a unique identification label as well.
6. Provide on all cables installed under this work, machine-generated labels with the cable ID clearly printed, in black uppercase lettering on a permanent adhesive, white label stock, covered with a permanent water resistant sealer. Labels must be placed on both ends of each cable at no more than 6" from the point at which the cable is broken out into individual copper pairs or strands from the connector or termination block or patch panel

7. Provide all labels in accordance with The facility's labeling standards and in accordance with the approved cable termination schedule.
8. Hand lettered label stock will not be accepted for final installation. Hand lettered stock is acceptable only for temporary labeling required during construction phases.
9. All cable IDs must be both physically and visually accessible upon completion of the project. Label locations must be such that all labels can be easily seen and read without disassembling cable bundles or stressing cable connections in order to gain visual access.
10. If at any time during the project, any label becomes illegible, is removed, or is found to be positioned so that it will not be easily readable when cable termination and dressing are completed, the Contractor must immediately replace it with a duplicate preprinted label.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings required prior to acceptance by The City of New York.

END OF SECTION 27 05 53

SECTION 27 08 00 - TESTING OF COMMUNICATIONS 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 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Copper cable test device
2. Optical fiber cable test device
3. Cable Test Results
4. As-built drawings

B. Related Sections include the following:

1. 271119 – Communications Termination Blocks and Patch Panels
2. 271513 – Communications Copper Horizontal Cabling
3. 271543 – Communications Faceplates and Connectors
4. 271619 – Communications Patch Cords, Station Cords, and Cross Connect Wire

1.3 SUMMARY

A. Provides specifications for a certification tester used for end to end testing, certification, and documentation of all test results to confirm the installed connectivity system complies with industry standards and specific category and performance ratings.

B. Contractor to notify the Commissioner three (3) days prior to testing any cabling.

1.4 REFERENCES

A. Codes and Regulations: (Note: Reference Division 01 for specific code versions governing the work in addition to the information noted below).

1. Refer to Section 270500 – Common Work Results for Communications

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.6 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.7 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 COPPER CABLE TEST DEVICE

A. Basis-of-Design Product: Subject to compliance with requirements, provide Fluke Networks or comparable product by one of the following

1. Greenlee Communications
2. Trend Networks
3. Or Approved Equivalent

B. Product Options

1. Select analyzer to comprehensively certify each category rated connection and record results verifying compliance with TIA/EIA performance specifications to meet the category rating of the system.

C. Description:

1. Must meet or exceed TIA Level IV compliant network cable-testing device certification by an independent laboratory, such as Intertek, for verification of high speed, TIA/EIA T568 compliant cables.
2. Copper test equipment must be capable of certifying Category-3, Category-5e, and Category-6A UTP or F/UTP links or channels independent of termination hardware configuration (RJ45 port or 110-style) for each level of performance.
3. Provide full 2-way Auto test of Category-3, 5e, 6 and 6A twisted pair links.
4. All test equipment must be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.

2.2 OPTICAL FIBER CABLE TEST DEVICE

A. Basis-of-Design: Subject to compliance with requirements, provide Fluke Networks or comparable product by one of the following

1. Greenlee Communications
2. Trend Networks
3. Or Approved Equivalent

B. Product Options:

1. Select analyzer to comprehensively certify each optical fiber connection and record results verifying compliance with TIA/EIA performance standards and manufacturer specifications.

C. Description:

1. The optical fiber source must permit full end to end testing of Multimode, Single-mode and LOMMF optical fiber cabling fully compliant with industry standards and manufacturer recommendations.
2. Available source types and wavelengths must be as follows:
   a. Multimode - 850nm LED and 1300nm LED.Versiv
   b. Single-mode – 1310nm FP Laser and 1550nm FP Laser.
   c. LOMMF – 850nm VCSEL and 1310nm FP Laser.

3. The power meter must be calibrated to read 850, 1300, 1310 and 1550nm wavelengths.

D. Accessory Products:

1. Interface Adapters
   a. DTX Fiber Module for Multimode cable @ 850 and 1300 nm – Model No. DTX-MFM2
   b. DTX Fiber Module for Gigabit LOMMF cable @ 850 and 1310 nm – Model No. DTX-GFM2
   c. DTX Fiber Module for Single mode cable @ 1310 and 1500 nm – Model No. DTX-SFM2
   d. Optical Fiber Mandrels.

2. Fiber Microscope
   a. Magnification of 200X or 400X for end face inspection
   b. Optional requirements
      i. Video camera systems are preferred.
      ii. Camera probe tips that permit inspection through adapters are preferred.
      iii. It is preferable to use test equipment capable of saving and reporting the end face image.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATIONS

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

B. Verify telecommunications cabling is installed and supported, terminated, mounted in an appropriate housing or terminated on the applicable component and labeled prior to certification testing and documentation.

C. Verify certification tester universal interface adapters and manufacturer patch cords that enable permanent link verification are in new condition not indicating any twisting or kinking resulting from incorrect storage of the tester interface adapters.

D. Optical fiber patch cords must be inspected to ensure connector surfaces are clean and free of defects that may affect testing results.

3.3 COPPER CABLE TESTING GENERAL REQUIREMENTS

A. Process:

1. Certification test 100% of the installed cabling plant including all backbone and horizontal four (4) pair UTP/ or F/UTP copper connections.
2. Follow manufacturers' instructions and recommended industry standards and guidelines to complete all TIA testing procedures to verify performance levels.
3. Follow manufacturer requirements for self-calibration procedures.
4. Update tester software to show specific project information including but not limited to:

    a. Date and time of testing
    b. Project name
    c. Field technicians name
    d. Cable identification number
    e. Cable manufacturer, type and part number

3.4 CATEGORY 6A COPPER CABLE TESTING REQUIREMENTS

A. General Requirements

1. Every cabling link in the installation must be tested for the following in accordance with the field test specifications defined in ANSI/TIA-568-C.2 “Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard”. This document will be referred to as the “TIA Cat 6 Standard.”:

    a. Wire Map
    b. Length
    c. Insertion Loss
    d. NEXT Loss
    e. PS NEXT Loss
    f. ACR-F Loss
    g. PS ACR-F Loss
    h. Return Loss
    i. Propagation Delay
    j. Delay Skew

2. The installed twisted-pair horizontal links must be tested from the IDF in the telecommunications room to the telecommunication wall outlet in the work area for compliance with the “Permanent Link” performance specification as defined in the Category 6A Standard.
3. One hundred percent of the installed cabling links must pass the requirements of the Category 6A Standard mentioned in A.1 above and as further detailed in Section B. Any failing link must be diagnosed and corrected. The corrective action must be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links must be provided in the test results documentation in accordance with Section C below.
4. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof must execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals).
5. The test equipment (tester) must comply with the accuracy requirements for level IIIe field testers as defined in ANSI/TIA-1152. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 3 of ANSI/TIA-1152 (Table 3 in this TIA document also specifies the accuracy requirements for the Channel configuration).
6. The RJ45 test plug must fall within the values specified in ANSI/TIA-568-C Annex C for NEXT, FEXT and Return Loss.
7. The tester must be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
8. The tester interface adapters must be of high quality and the cable must not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor must provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure

that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable must not be of twisted-pair construction.

9. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.
10. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter must be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent '*' results must determine approval or disapproval of the element under test must be defined in the relevant detail specification, or agreed on as a part of a contractual specification.
11. Commissioner must be invited to witness field testing. The Commissioner must be notified of the start date of the testing phase five business days before testing commences.
12. Commissioner has the right (at Commisssioner's discretion) to select a random sample of 5% of the installed links. The Commissioner must test these randomly selected links and the results are to be stored in accordance with the prescriptions in B1 below. The results obtained must be compared to the data provided by the contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the contractor must repeat 100% testing and the cost must be borne by the contractor.

B. Test Result Documentation

1. The test results/measurements must be transferred into a Windows-Excel and into a test management software format. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time.
2. The database for the completed job must be stored and delivered on CD-ROM or DVD including the software tools required to view, inspect, and print any selection of test reports.
3. General Information to be provided in the electronic database with the test results information for each link:

    a. The identification of the customer site as specified by the end-user
    b. The identification of the link in accordance with the naming convention defined in the overall system documentation
    c. The overall Pass/Fail evaluation of the link-under-test
    d. The name of the test limit selected to execute the stored test results
    e. The cable type and the value of NVP used for length calculations
    f. The date and time the test results were saved in the memory of the tester
    g. The brand name, model and serial number of the tester
    h. The identification of the tester interface
    i. The revision of the tester software and the revision of the test standards database in the tester
    j. The test results information must contain information on each of the required test parameters that are listed in Section B and as further detailed below under paragraph C5.

4. The detailed test results data to be provided in the electronic database for must contain the following information:
For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.

   a. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value
   b. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value
   c. Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value
   d. Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair
   e. Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link
   f. NEXT, ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link
   g. PS NEXT and PS ACR-F: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link

(1): Nominal Velocity of Propagation (NVP) expresses the speed of the electrical signals along the cabling link in relation to the speed of light in vacuum ($3x10^8$ m/second). Insulation characteristics and twist rate of the wire pair influence NVP in minor ways. Typically, an 'average' value for NVP is published for all four wire-pairs in a data cable.

(2): 'Margin' designates the difference between the measured value and the corresponding test limit value. For passing links, 'worst case margin' identifies the smallest margin over the entire frequency range; the point at which the measured performance is "closest" to the test limit.

3.5 FIBER OPTIC CABLE TESTING REQUIREMENTS

A. General

1. All tests performed on optical fiber cabling that use a laser or LED in a test set must be carried out with safety precautions in accordance with ANSI Z136.2.
2. All outlets, cables, patch panels and associated components must be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems must be redone on completion of the work.

B. Optical Fiber Cable Testing

1. Field-test instruments must have the latest software and firmware installed.
2. Link and channel test results from the OLTS must be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.
3. Fiber end faces must be inspected at 200X or 400X magnification. 200X magnification is suitable for inspecting multimode and single mode fibers. 400X magnification may be used for detailed examination of single mode fibers. Scratched, pitted or dirty connectors must be diagnosed and corrected.
    a. It is preferable that the end face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.

4. Testing must be performed on each cabling segment (connector to connector).
5. Testing must be performed on each cabling channel (equipment to equipment) that is planned for use per the Commissioner's instructions.
6. Testing of the cabling must be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing must be between 1 m and 5 m in length.
7. Optical loss testing
    a. Backbone link
        i. Multimode (OM4) backbone links must be tested at 850 nm and 1300 nm in accordance with ANSI /TIA-526-14-B, One-cord reference method (Annex A)
        ii. Single mode (OS2) backbone links must be tested at 1310 nm and 1550 nm in accordance with ANSI /TIA-526-7, Method A.1, Insertion Loss Using an Optical Power Meter – One Jumper Cable Measurement.
        iii. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.
        iv. Use the One Reference Jumper Method specified by ANSI/TIA -526-14-B, Annex A and ANSI/TIA -526-7, Method A.1. The user must follow the procedures established by these standards or application notes to accurately conduct performance testing.

8. Magnified End Face Inspection
    a. Fibers must be inspected at 250X or 400X magnification. 250X magnification is suitable for inspecting multimode and single mode fibers.

9. Length Measurement
    a. The length of each fiber must be recorded.
    b. It is preferable that the optical length be measured using an OLTS.

10. Polarity Testing
    a. Paired duplex fibers in multi-fiber cables must be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA 568 C.0. The polarity of the paired duplex fibers must be verified using an OLTS.

C. Administration

1. Test results documentation
   a. Test results saved within the field-test instrument must be transferred into a Windows-Excel and into a test management software format. These test records must be uploaded to the PC unaltered, i.e., “as saved in the field-test instrument”. The file format, CSV (comma separated value), does not provide adequate protection of these records and must not be used.
   b. The test results documentation must be available for inspection by the Commissioner during the installation period and must be passed to the Commissioner within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer must retain a copy to aid preparation of as built information.
   c. The database for the complete project, including twisted-pair copper cabling links, if applicable, must be stored and delivered on CD-ROM, DVD or USB prior to The City of New York’s acceptance of the building. CD-ROM, DVD or USB must include the software tools required to view, inspect, and print any selection of the test reports.
   d. Circuit IDs reported by the test instrument should match the specified label ID.
   e. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and must contain the following information
      i. The identification of the customer site as specified by the end-user
      ii. The name of the test limit selected to execute the stored test results
      iii. The name of the personnel performing the test
      iv. The date and time the test results were saved in the memory of the tester
      v. The manufacturer, model and serial number of the field-test instrument
      vi. The version of the test software and the version of the test limit database held within the test instrument
      vii. The fiber identification number
      viii. The length for each optical fiber (Optionally the index of refraction used for length calculation when using a length capable OLTS)
      ix. Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
      x. The overall Pass/Fail evaluation of the link-under-test for OLTS measurements
      xi. A picture or image of each fiber end-face and a pass/fail status of the end-face based upon visual inspection.

3.6 ACCEPTANCE OF TEST RESULTS

A. Unless otherwise specified by the Commissioner, each cabling link must be in compliance with the following test limits:

1. Optical loss testing
   a. Multimode and Single mode links
      i. The link attenuation must be calculated by the following formulas as specified in ANSI/TIA-568-C.0.

a) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)
b) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)
c) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
d) Maximum allowable connector_loss = 0.50 dB
e) Splice_Attn (dB) = number_of_splices * splice_loss (dB)
f) Maximum allowable splice_loss = 0.3 dB
g) The values for the Attenuation Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 50/125 µm	850	3.5	1300	1.5
Single-mode (Inside plant)	1310	1.0	1550	1.0
Single-mode (Outside plant)	1310	0.5	1550	0.5

2. Magnified end face inspection
   a. Fiber connections must be visually inspected for end face quality.
   b. Scratched, pitted or dirty connectors must be diagnosed and corrected.

B. All installed cabling links and channels must be field-tested and pass the test requirements and analysis as described in Section 3.4. Any link or channel that fails these requirements must be diagnosed and corrected. Any corrective action that must take place must be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels must be provided in the test results documentation in accordance with Section 3.4.

C. Acceptance of the test results must be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Commissioner.

1. Note: High Bandwidth applications such as 1000BASE-SX, 10GBASE-SR, and 40GBASE-SR4 impose stringent channel loss limits. Where practical, certification should consider loss length limits that meet maximum channel (transmitter to receiver) loss.

Performance specification for MM fiber at 850 nm

Fiber Type		Bandwidth	1000BASE-SX		10GBASE-SR		40GBASE-SR4	
	µm	(MHz• Km)	Length (m)	Loss (dB)	Length (m)	Loss (dB)	Length (m)	Loss (dB)
OM1	62.5	200	275	2.38	33	2.5		2.4
OM2	50	500	550	3.56	82	2.3		2.2
OM3	50	1500		3.56	300	2.6	100	1.9
OM4	50	3500			400	2.9	150	1.5

3.7 REPAIR

A. Any connections failing to meet referenced standards or more stringent performance requirements stated above, must be removed and replaced with connections that prove, in additional testing, to meet or exceed the performance standards set forth.

3.8 RE-INSTALLATION

A. No additional burden to the Commissioner regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with The Commissioner prior to beginning the work.

3.9 CLOSEOUT ACTIVITIES

A. Contractor to submit all test results and any test documentation required prior to acceptance by The City of New York.

B. Record copy and as-built drawings

C. Provide record copy drawings periodically throughout the project as requested by the Commissioner, and at end of the project on CD-ROM, DVD or USB. Record copy drawings at the end of the project must be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination point. CAD drawings are to incorporate test data imported from the test instruments.

D. The as-built drawings must include, but are not limited to block diagrams, frame and cable labeling, cable termination points, equipment room layouts and frame installation details. The as-built must include all field changes made up to construction completion:

1. Field directed changes to pull schedule.
2. Field directed changes to cross connect and patching schedule.
3. Backbone cable routing or location changes.
4. Associated detail drawings.

END OF SECTION 27 08 00

SECTION 27 11 16 - COMMUNICATIONS CABINETS, RACKS, FRAMES AND ENCLOSURES

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 Racks

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 26 “Grounding and Bonding for Communications Systems”
3. Section 27 05 53 “Identification for Communications Systems”
4. Section 27 11 19 “Communications Termination Blocks and Patch Panels”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to 27 05 00 “Common Work Results for Communications”.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 EQUIPMENT RACKS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Chatsworth Products Inc., or comparable product by one of the following

1. Ortronics
2. The Siemon Company
3. Or Approved Equivalent

B. Product Options:

1. Select relay racks and components capable of supporting the telecommunications cable and equipment quantities required for each location.

C. Description:

1. Racks must be used for mounting of patch panels, wire management, and network equipment in the IDF Room
2. Racks must be of high strength aluminum construction.
3. Minimum weight capacity of 1500 lbs. (680 kg).
4. Racks must be supplied with (2) top angles.
5. Racks must be 73.5 inch (1867 mm) high, 24 inch (610 mm) deep, and 19 inch (482 mm) mountable with standard EIA-310-D hole spacing. Racks must contain mounting dimension of a minimum of forty (40) rack units marked in a contrasting color.
6. Racks must be mounted to the wall
7. Racks must be provided with equipment mounting screws (50 per rack minimum).
8. Rack finish must be Black.

D. Accessory Products:

1. Provide (2) APC, Chatsworth, or Tripp-Lite Horizontal PDU (Nema L5-20P) in wall mount rack, or approved equivalent

2. Grounding accessories as required to bond all removable rack parts to grounding system. Racks must be equipped with a vertical Rack Grounding Busbar (RGB) bonded with a #6 AWG wire with green insulation to the nearest Telecom Grounding Busbar (TGB). Use lug type connectors at each end

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:

1. Electrical requirements (conduit installation and capacity)
2. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
3. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the Commissioner and obtain written instructions for changes or revisions.

3.3 EQUIPMENT RACKS

A. Process:

1. Install all racks per the manufacturer's recommended instructions.
2. Furnish and install equipment racks in each location as shown on the drawings, for the mounting of cable and The City of New York provided equipment. Bond the racks and cabinets to the mesh bonding network/signal reference grid or telecommunications grounding bus bar in the room or below the raised floor with # 6 AWG wire as specified in ANSI/TIA-607-B.
3. Anchor all racks and frames to the raised floor and cross brace to structure above.
4. Seismically brace the products indicated in this specification adhering to construction regulations relative to the buildings seismic zone.
5. Contractor must request written authorization prior to drilling into any surface more than one and one half inch (1.5") in depth
6. Existing Cabinets to be relocated must include as part of the contractor's preparation and staging work a visual inspection for missing or damaged material including accessories and power strips. Any irregularities must be documented and submitted for verification to the Commissioner.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 11 16

SECTION 27 11 19 - COMMUNICATIONS TERMINATION BLOCKS AND PATCH 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. Copper Patch Panels

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 53 “Identification for Communications Systems”
3. Section 27 11 16 “Communications Cabinets, Racks, Frames, and Enclosures”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to 27 05 00 “Common Work Results for Communications”.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 COPPER PATCH PANELS – HORIZONTAL CABLES

A. Basis-of-Design Product: Subject to compliance with requirements, provide The Siemon Company HD6-24 and HD-48 or comparable product by one of the following:

1. Commscope Systimax
2. Ortronics
3. Or Approved Equivalent

B. Description:

1. Modular RJ45 jack panels.
2. Flat style panels.
3. Panel finish must be black.
4. Able to meet or exceed the channel specifications of the ANSI/TIA/EIA-568-C.2-10 standard for a Category 6A system up to 500 MHz
5. EIA/TIA T568B wiring scheme.
6. Suitable for mounting in standard EIA 19-inch racks.
7. Provided with a minimum of 48 connectors, as defined in this specification, housed in 2 RMU of usable rack height.
8. Strain relief for each cable terminated on the connector. Provide strain relief bars on the rear of all panels.
9. Store cable reserve with no bends sharper than a 2-inch (50 mm) bend radius.
10. Provide sufficient finger space to allow connectors to be mounted and demounted readily.
11. Space for labeling of each individual connector.
12. Must allow any individual cable to be terminated or otherwise handled without disturbing other cables.
13. Complete with designation strips
14. Used for Workstation and WAP cabling terminations as indicated on drawings.

C. Accessory Products:

1. Provide any accessory products related to the patch panels to provide a complete and functional infrastructure system

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:

1. Electrical requirements (conduit installation and capacity)
2. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
3. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the Commissioner and obtain written instructions for changes or revisions.

3.3 COPPER PATCH PANELS

A. Process:

1. Install patch panels for the termination of all copper cables installed under this work. Mount the patch panels into the equipment racks as shown in the drawings. Provide patch panels complete with designation strips.
2. Provide optical fiber patch panels as shown on the drawings for the termination of optical fiber cables installed under this work. Provide patch panels complete with coupler panels, coupler modules, and cable designation strips.
3. Provide horizontal wire management panels between flat patch panels installed in each equipment rack and cabinets; angled patch panels do not require horizontal wire management panels.
4. Install all optical fiber and UTP components under the guidelines of the manufacturer's recommended instructions and per all TIA 568C standards and manufacturer-approved industry practices as shown in the T-series drawings.
5. The installation and performance parameters of all installed cable termination panels must be verified by the contractor through TIA 568C testing procedures.
6. Label all cable termination panels to identify each port and each specific panel in accordance with the TIA-606-B labeling scheme approved by the Commissioner.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 11 19

SECTION 27 11 23 - COMMUNICATIONS CABLE MANAGEMENT AND LADDER RACK

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. Ladder Rack

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 11 16 “Communications Cabinets, Racks, Frames, and Enclosures”
3. Section 27 11 19 “Communications Termination Blocks and Patch Panels”

1.3 REFERENCES

A. Codes and Regulations: (Note: Reference Division 01 for specific code versions governing the work in addition to the information noted below).

1. Refer to Section 270500 – Common Work Results for Communications

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 LADDER RACK

A. Basis-of-Design Product: Subject to compliance with requirements, provide Chatsworth Products, Inc., or comparable product by one of the following

1. B-Line
2. Middle Atlantic
3. Or Approved Equivalent

B. Description:

1. Open rung TELCO-style ladder type cable tray with runway dropouts, complete with splice hardware, runway termination hardware, and ceiling support hardware. Constructed of steel tubing with 12-inch (305 mm) rung spacing.
2. Size: As indicated on drawings.
3. Cross-members welded at 12-inch (305 mm) intervals.
4. Color: Black

C. Accessory Products:

1. Radius drop-cross member, radius drop-stringer, junction splice kit, butt splice kit, wall angle support kit, end closing kit, protective end caps, “L” bracket for ground wire support, 6” cable runway elevation kit.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:

1. Electrical requirements (conduit installation and capacity)
2. Adequate clearances of doors, riser spaces, and ceilings for all component of the telecommunications system.
3. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the Commissioner and obtain written instructions for changes or revisions.

3.3 LADDER RACK

A. Process:

1. Install all ladder rack per the manufacturer's recommended installation instructions, as indicated in the project drawings. Follow all mounting and support guidelines.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 11 23

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SECTION 27 15 13 - COMMUNICATIONS COPPER HORIZONTAL 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. 4-pair UTP cable – Category 6A

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 53 “Identification for Communications Systems”
3. Section 27 08 00 “Testing of Communications Systems”
4. Section 27 11 16 “Communications Cabinets, Racks, Frames, and Enclosures”
5. Section 27 11 19 “Communications Termination Blocks and Patch Panels”
6. Section 27 15 43 “Communications Faceplates and Connectors”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to Section 270500 – Common Work Results for Communications

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 4-PAIR UTP CABLING

A. Basis-of-Design Product: Subject to compliance with requirements, provide the Siemon Company or comparable product by one of the following

1. Commscope Systimax
2. Ortronics
3. Or Approved Equivalent

B. Description

1. One (1) 4-pair UTP Category 6A cable with a plenum rated outer jacket.
2. Physical specifications: 4 twisted pair – 23 AWG, solid copper conductors, 100-Ohm nominal impedance +/ 15%.
3. Electrical characteristics: Able to meet or exceed the channel specifications of ANSI/EIA/TIA-568-C-2.10 standard, “Transmission Performance Specifications for 4-Pair 100 Ohm Category 6A Cabling”, with available bandwidth up to 500 MHz
4. Mechanical requirements:
   a. Conductors: 23 AWG - solid bare copper
   b. Outer Jacket: Flame retardant PVC
   c. Conductor Insulation: FEP
   d. Break Strength: Minimum 90 lbs.
5. Color Code:
   a. Jacket: White
6. Insulation:
   a. Pair 1: White/Blue - Blue/White
   b. Pair 2: White/Orange - Orange/White
   c. Pair 3: White/Green - Green/White
   d. Pair 4: White/Brown - Brown/White
7. UL listed, Type CMP.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:

1. Electrical requirements (conduit installation and capacity)
2. The TRs are the size shown on the project drawings.
3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the Commissioner and obtain written instructions for changes or revisions.

3.3 4-PAIR CABLING INSTALLATION

A. Process:

1. Install all horizontal station cabling per the manufacturer’s recommended installation instructions, under the guidelines of TIA/EIA-568C and BICSI standards, and in quantities indicated in the drawings.
2. Install all cables with proper attention paid to bend radii, pulling method, attachment method, and pulling forces. All cable must be pulled using an appropriate measuring device to ensure that the specified force is not exceeded as noted in TIA/EIA 568C and BICSI guidelines. Also refer to the cable manufacturer's specifications for exact cable requirements per the particular cable type.
3. All cables must be visually inspected for insufficient bend radius during and after pulling. Damaged cables, or those installed under questionable methods and/or circumstances must be replaced at no additional cost to The City of New York.
4. Contractor must ensure that all TIA/EIA and industry standards are met with special regards to maximum stripping length of cable jackets. No four (4) pair F/UTP cables must have more than ½ inch (12.7 mm) of cable jacket removed beyond the termination points.
5. Install the horizontal cabling with attention paid to aesthetic means and methods when routing cabling within IT spaces.
6. All cabling distributed horizontally through metal stud framing must have plastic protective bushings inserted to protect cables prior to installation.

7. All cables must be clearly labeled on both ends and in an accessible location no more than 6-inches (152 mm) from the cable ends.
8. The City of New York reserves the right to specify a new location for any outlet or equipment without increasing contractor unit cost – providing that the new location is specified prior to roughing-in of technology cable and is not farther than 10-feet (3m) away from the original location specified.
9. When conduits, sleeves and cable trays (provided under the electrical work) are not present, support all cables with J-hooks and/or cable straps mounted to the ceiling above. Provide supports at maximum 5-foot intervals. Do not install more than 24 cables in any single J-hook for support. When more than 24 cables must be installed, provide additional J-hooks or cable straps.
10. Install workstation cable in accordance with this Specification, the approved Cable Termination Schedule, the manufacturer's recommendations, and the Telecommunications Distribution Drawings.
11. After dressing each cable to its final location, remove only enough jacketing to allow the conductors to be splayed and terminated in a neat and uniform fashion. Every effort must be made to maintain jacketing integrity by removing only as much jacketing as is practical to accomplish termination. For twisted pair cables, maintain the manufacturers' twisting of the wire pairs through to the point of termination.
12. Install all U/UTP cable according to manufacturer's installation standards.
13. Terminate all cables neatly, with enough slack to pull off, test, re-cut and re-terminate each cable as needed.
14. When pulling cables through conduits, leave in-place all draglines for future use.
15. Provide a 12-inch (305 mm) service loop at all workstation locations unless otherwise noted. The workstation loops must be stored at the top of each conduit stub-up in the accessible ceiling area, or wherever it is possible to be concealed and supported.
16. Provide Velcro tie wraps to organize and bundle all category rated cabling installed under this Work. Install the approved Velcro strips long enough to overlap at least 1.5 inches (38 mm) around the installed cables. Plastic tie wraps must not be used.
17. Do not allow telecommunication cables to run parallel with electrical cables/conduits, unless they are separated by a minimum of 12-inches (305 mm).
18. Any telecommunications cable that must cross over electrical cables/conduits must do so only at 90-degree angles.
19. Do not lay telecommunications cables unprotected on the floor at any time. If cables must be left on any floor, protect the cables so that they may not be walked on or have any material or equipment placed or rolled on top.
20. Maintain manufacturer's recommended minimum bend radius of the cables. Do not stretch, stress, tightly coil, bend or crimp the workstation cables during the installation or when leaving them out of the way of other trades during the staging of the work. The Contractor, at the Contractors sole expense, must replace all abused or stressed cables.

3.4 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for

re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.5 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 15 13

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SECTION 27 15 43 - COMMUNICATIONS FACEPLATES AND CONNECTORS

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. UTP Connectors
2. Outlet Housing Components (faceplates etc.…)

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 53 “Identification for Communications Systems”
3. Section 27 08 00 “Testing of Communications Systems”
4. Section 27 15 13 “Communications Copper Horizontal Cabling”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to Section 270500 – Common Work Results for Communications

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 UTP CONNECTORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the Siemon Company or comparable product by one of the following

1. Commscope Systimax
2. Ortronics
3. Or Approved Equivalent

B. Description:

1. Non-keyed 8 pin modular connectors, suitable to terminate UTP 4-pair cables. Suitable to be mounted in corresponding faceplate, mounting plate or surface mount box.
2. Provide Category 6A rated eight-conductor RJ45 connector.
3. EIA/TIA T568B wiring scheme.
4. Performance criteria: Able to meet or exceed the channel specifications of the ANSI/TIA/EIA-568-C.2-10 standard for Augmented Category 6 system performance up to 500 MHz
5. Color: Multiple Different Colors, to be confirmed before ordering
6. Colors to be coordinated with Commissioner during submittal phase

C. Accessory Products:

1. Color-coded Icons – furnish and install (1) color-coded icon for each UTP connector installed in this project. Exact colors and styles must be determined during product submittal review.
2. Provide any accessory products related to the UTP connectors required to provide a complete and functional infrastructure system.

2.2 OUTLET HOUSING COMPONENTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the Siemon Company or comparable product by one of the following

1. Commscope Systimax
2. Ortronics
3. Or Approved Equivalent

B. Description:

1. All outlet housings at the various technology outlet locations must provide the designated number modular insert ports as indicated in the drawings.
2. All flush-mounted faceplates must be available in one (1), two (2), three (3), & four (4) port configurations of the same single gang style outlet Faceplates for wall-mounted phones must be one (1) port stainless-steel single gang faceplates that have wall-mount lugs allowing vertical phone mounting.
3. Faceplates for flush floor mounted outlets must be coordinated with the floor box that will be selected and installed outside the scope of this section.
4. System furniture faceplates must be capable of fitting in the furniture system selected by the Commissioner. Quantity of furniture faceplates must satisfy outlet jack requirements. Furniture faceplate extenders must be used (if required) to maintain proper bend radii within the furniture raceway/pathway.
5. Surface mounted boxes must be capable of the quantity of outlet jack requirements at each outlet locations indicated in the drawings. Provision (1) surface mount outlet box at all furniture-mounted outlet locations and Wireless Access point locations in the ceiling
6. All surface mounted boxes installed above ceiling in plenum air spaces must be plenum rated.
7. Surface-raceway mounted outlets must be capable of being installed within surface-raceway provided and installed by other trades. Contractor to provide appropriate mounting bezels and keystone jacks (as necessary) for proper mounting within surface raceway.
8. All outlet-housings must provide a clear TIA/EIA 606-B labeling location for both the individual outlet port and the entire outlet housing location, unless otherwise indicated in the project drawings.
9. All faceplates must be provided in a color that matches the electrical trim color unless otherwise noted in the drawings. Colors to be coordinated with Commissioner during submittal phase.

C. Accessory Products:

1. Provide any accessory products related to the workstation outlet housing components required to provide a complete and functional infrastructure system.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

B. Confirm all housings including back boxes, floor boxes and poke-through provided for the telecommunications connectivity system will support the installation of project approved manufacturer components prior to purchase of the components described in this specification.

3.3 UTP CONNECTORS

A. Process:

1. Install all connectors under the guidelines of the manufacturers' recommended instructions and per all TIA-568-C standards, BICSI guidelines, and manufacturer approved industry practices.
2. The installation and performance parameters of all installed couplers and connectors must be verified by the trade contractor through TIA-568-C testing procedures.
3. Color of all connectors must be coordinated with the Commissioner before purchase and installation.

3.4 OUTLET HOUSINGS

A. Process:

1. Color of all outlet housing components must be coordinated with the Commissioner and/or The City of New York before purchase and installation.
2. All technology outlets located on walls must be flush mounted, level and plumb.
3. All technology outlets must be mounted at right angles and parallel to the floor, unless installation requirements or design dictate otherwise.
4. Install blank inserts in outlet housing spaces that are not being filled with cable termination modules. Blank inserts must match the workstation housing color, unless otherwise indicated in the drawings.
5. All outlets located in systems furniture may be served from a wall adjacent to the furniture cluster or a floor box/floor-feed. If the cable is exposed prior to entering furniture raceway, install spiral wrap tubing to protect the cable per the manufacturer's recommendations.
6. All outlet housings as well as each individual utilized port must be labeled in accordance with the facility's approved labeling scheme.

3.5 RE-INSTALLATION

A. No additional burden to The City of New York regarding costs, network down-time and/or end user interruption must result from the re-installation of specified components. Scheduling for

re-installation work must be coordinated, in writing, with the Commissioner prior to beginning the work.

3.6 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 15 43

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SECTION 27 16 19 - COMMUNICATIONS PATCH CORDS AND STATION CORDS

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. 4-pair UTP Patch cords
2. Fiber Optic Patch Cords

B. Related Sections:

1. Section 27 05 00 “Common Work Results for Communications”
2. Section 27 05 53 “Identification for Communications Systems”
3. Section 27 08 00 “Testing of Communications Systems”
4. Section 27 11 19 “Communications Termination Blocks and Patch Panels”
5. Section 27 15 43 “Communications Faceplates and Connectors”

1.3 REFERENCES

A. Codes and Regulations:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.5 SUBMITTALS

A. List of submittals:

1. Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.6 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

PART 2 - PRODUCTS

2.1 COPPER PATCH CORDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the Siemon Company or comparable product by one of the following

1. Commscope Systimax
2. Ortronics
3. Or Approved Equivalent

B. Description

1. Physical Specifications: 4-pair, 26 AWG stranded copper UTP cable, with male 8-pin modular RJ45 plugs with insert-molded strain relief on both ends.
2. Performance Characteristics: Able to meet or exceed the channel specifications of the ANSI/TIA/EIA-568-C.2-10 standard for Category 6A cable up to 500 MHz
3. All patch cords supplied must comply with ANSI/TIA/EIA-568-C.2-1, Production Modular Cord NEXT Loss Test Method, and Requirements for UTP Cabling.
4. Wiring: T568B.
5. Contractor must provide and include into the bid sum the price for the patch cords shown in the following quantities:
   a. At IDF closet, contractor must furnish and install (1) copper patch cord per cable installed. Patch cord must be multi-length with minimal slack.
   b. At workstation end, contractor must furnish and install (1) copper patch cord per faceplate installed. Exact patch cord length must be determined with client prior to ordering.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with

installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:

1. Electrical requirements (conduit installation and capacity)
2. The MDF is the size shown on the project drawings.
3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the Commissioner and obtain written instructions for changes or revisions.

3.3 CLOSEOUT ACTIVITIES

A. Contractor must provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Commissioner.

B. Contractor to submit all as-built drawings and any test documentation required prior to acceptance by The City of New York.

END OF SECTION 27 16 19

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SECTION 27 41 16 – INTEGRATED AUDIO-VIDEO SYSTEMS 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. Integrated audiovisual equipment / systems and related control systems & programming.
   2. Background Music / Public Address systems

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. List of Submittals: Refer to Section 27 05 00 “Common Work Results for Communications Systems”.

1.5 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”

1.6 EQUIPMENT DELIVERY AND STORAGE

A. Costs of all shipping to the site, and of all storage requirements, will be borne by the Contractor. It will be the responsibility of the Contractor to make appropriate arrangements, and to coordinate with the authorized personnel at the site, for the proper acceptance, handling, protections, and storage of equipment so delivered.

1.7 REFUSE

A. The Contractor will keep the site and building free of all debris and clutter, to the satisfaction of The Commissioner. On a daily basis, the Contractor will remove refuse and rubbish related to the specified work from the site and building and will leave the relevant areas and equipment clean and in an operational state. The Contractor will be responsible for repairing any damage caused to the site and building by the

Contractor's installation activities, at no cost to The City of New York.

1.8 SCOPE OF WORK

A. General: Provide audio visual systems design, engineering, and installation within all phases and spaces of the project, as defined by the related documents. Systems will include all devices, equipment, installation, programming, and commissioning in accordance with requirements of the contract documents and drawings.

B. The work detailed within the contract documents has been specified to meet certain requirements for performance, appearance, and costs. It will be the responsibility of the Contractor to implement the guidelines and requirements contained in the contract documents and translate them into a complete design package containing all elements necessary for a complete, operational, and functionally integrated Audio Visual System(s).

C. The Contractor will provide complete, turnkey multimedia systems performing all of the services and functions as described herein, together with all other apparatus, cable, materials, labor, tools, transportation, and any other resources necessary to provide a complete and working system.

D. Specifically, the work will include, but is not limited to:
   1. Communicating and coordinating with Commissioner, and other trades complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of this specification.
   2. Generating and submitting Shop Drawings as required for approvals and As-Built drawings as specified herein.
   3. Providing all cables and pull strings in conduits for the specified systems.
   4. Furnishing and/or installing all equipment as specified.
   5. Installing City of New York supplied equipment as specified.
   6. Take delivery of all City of New York supplied components and equipment, excluding Room PCs, at Contractor's staging facility for integration into AV equipment racks.
   7. From the initial point of delivery Contractor will be responsible for storing, integrating, and maintaining as part of the system warranty all The City of New York supplied components.
   8. Furnishing all lifts, ladders, scaffolding or other resources as needed for proper safe installation. Coordinating with other trades as needed.
   9. Interconnecting all components, both internal and external to rack cabinets.
   10. Providing patch cables for connection of all IP-enabled audiovisual equipment to associated data network outlets, including but not limited to The City of New York supplied Room computers, production computers, laptop connections, control system processors, codecs, and projectors. This applies to all equipment installed by the Contractor, including The City of New York-Furnished items. Coordinate patch cable requirements with the greater building-wide structured cabling system.
   11. The contractor will coordinate and secure, from The City of New York, the IP configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup & authorization, and the like for use by Ethernet equipped system components. The Contractor will coordinate the installation and configuration of these devices with The Commissioner
   12. Secure, from The City of New York, private IP addresses for use by Ethernet equipped control system processors.
   13. Ensuring that all cabling, equipment, and terminations are installed in accordance with accepted industry standards, approved shop drawings, manufacturer's recommendations and as stipulated

herein.

14. Verify that all audiovisual equipment rack locations are provided with adequate clearance, ventilation, and cable management systems to ensure all equipment is operating within manufacturer published tolerances.
15. Coordinating and providing cable labels as stipulated by The City of New York and/or specified herein.
16. Providing cable management hardware as required including in areas audiovisual rack cabinets; between pieces of equipment not housed in rack cabinets; and as required to extend cabling from rack cabinets and equipment to the greater facility cabling infrastructure.
17. Providing custom cover plates, wall plates, I/O connection plates, floor box insert plates as required for a complete and working system. Final selection of finishes will be coordinated with the Commissioner.
18. Coordinating with the Commissioner on the final selection of all technical furniture including design details (make/model), available options, dimensions, cable management needs, color, finish, and the like.
19. Coordinating with furniture manufacturer or others who are providing all necessary furniture/millwork modifications ("cut-outs" or other) as required allowing for a neat and professional installation of integrated technology system components. This includes, but is not limited to integrated table/lectern "cubbies", table-top microphones, cable management grommets, etc.
20. Coordinating with the furniture manufacturer, and Commissioner on cable management needs and equipment installation requirements in all spaces so equipped and as outlined in 'Installation Practices'.
21. Coordinate with local entities as necessary (manufacturer, SBE, FCC, etc.) to determine final channel selection for all wireless devices and resolve conflicts where they may occur.
22. Ensuring that all equipment, with the exception of portable equipment, is firmly fastened or attached in place. A safety factor of at least four will be utilized for all brackets, fasteners and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.
23. Verifying and providing all projector lenses as required.
24. Providing all projector mounts, including guy wires, clamps, or support assemblies back to structural members. Obstructions vary from room to room; Contractor must pay close attention to this issue on a room-by-room basis.
25. Mounting / aligning the projectors so that digital keystone correction is not required. Optical lens shift will be employed, only, if necessary, to align the image with the image area. Where possible all projectors mounted below the ceiling will be mounted and adjusted to be perpendicular to the screen surface.
26. Coordinating with the Commissioner on the audiovisual control system connection to the projection screens, as required.
27. Adjusting motorized projection screen limits as required optimizing the amount of black drop in conjunction with the projection system and field conditions. Refer to the drawings for specified dimensions.
28. Providing speakers as complete assemblies with back boxes, grilles, tile bridges, wall mounts, hanging hardware and other installation hardware as required.
29. Coordinating with the Commissioner on final color selection, and/or the painting of any exposed loudspeakers and any/all exposed system components to match the room's aesthetics and finishes.
30. Providing control system design submittals and up to two control system design revisions.
31. Developing and installing all custom control programming code as required and/or as specified herein.
32. Providing control system interfaces to motorized screens, as specified.

33. Providing low voltage control system interfaces to facility lighting and share systems where specified.
34. Providing the executable (uncompiled) programming control code as defined herein.
35. Developing and installing all custom software for DSP devices as required to optimize system performance.
36. Generating and Submitting "Progress Reports" as defined herein.
37. Ensuring that all individual components function as intended by this Specification.
38. Ensuring that the entire multimedia systems function as intended by this Specification.
39. Providing any/all patching, caulking, fire stopping, and painting required to restore damaged finishes during installation.
40. Providing to The City of New York, upon completion, all accessories and ancillary items included with the manufacturer's equipment but not used for the physical installation of the device. This will include all user manuals, remote controls, batteries, tools, installation hardware, carrying cases, protective covers, etc.
41. Testing, adjusting, and fine-tuning the completed systems and components.
42. Coordinating and conducting an acceptance walk-through and sign-off session with The Commissioner.
43. Documenting the completed installed systems as defined herein.
44. Conducting instruction in systems operation for the facility's maintenance personnel.
45. Providing "sign-off" documents for each space and/or space type as defined herein.
46. Verifying required cable lengths for all bulk cable or manufactured cable assemblies prior to ordering as outlined in 'Installation Practices.'
47. Verify AV related infrastructure requirements including conduit, power and data as shown on the contract documents is sufficient to meet all AV systems requirements.
48. Verifying all display mounting conditions including width, height and depth of all recesses or Commissioner cutouts required for displays and other flush mounted equipment.
49. Providing onsite support staffing as outlined in this Specification.

1.9 RELATED WORK

A. Audiovisual subcontractor will coordinate with Electrical trade on raceway/junction box locations for audio visual equipment and routing of audio, video, control, and power cables/raceway from equipment, terminal and pull boxes to system equipment racks.

B. Coordinate work of this section with installation of wall and ceiling finishes.

1.10 WORK EXCLUDED

A. Work not included under this section will be:
   1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, floor boxes, lighting fixtures, lighting dimming systems, or millwork except where otherwise specified herein.
   2. Installation of wall or ceiling mounted projection screens.
   3. With the exception of audiovisual network switches and interconnections as indicated in the audiovisual systems equipment list and system drawings the data and voice network is provided by others trades.

1.11 SITE CONDITIONS

A. The Contractor will verify dimensions of equipment, equipment arrangements, space availability (including any millwork or cabinetry provided by other trades) and provide systems that work within the constraints of the space available. The Contractor will notify the Commissioner of any situation where space constraints are a problem, prior to the ordering or purchase of equipment. The Contractor will bear the expense of providing alternate equipment, which will work within the available space, if space availability problems are discovered after equipment is ordered.

B. Drawings indicate locations of equipment and components. Changes in the location, and offsets of same to accommodate building conditions, and coordination with the work of other trades will be made prior to initial installation, without additional cost to The City of New York.

C. The Contractor will ensure during installation that access is provided to equipment and components requiring operation, service or maintenance within the life of the system.

D. It will be the responsibility of the Contractor to identify any condition where the recommended environmental and/or electrical operating parameters for specified equipment/products cannot be assured. Should such condition exist, it will further be the responsibility of the Contractor to notify the Commissioner of any such condition.

1.12 LAWS AND REGULATIONS

A. All equipment, cabling, materials, and installation methodology will conform to the requirements of the National Board of Fire Underwriters, the current published edition of the National Electrical Code. The Contractor will obtain and pay for any additional permits and inspections required by NYC DOB.

1.13 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. All equipment for this installation will be new, less than one year from the date of manufacture, and without any blemish or defect.

C. The Contractor will maintain the same project manager and field supervisor throughout the installation, and where practical, maintain the same installers.

D. The Contractor will supply and install any incidental equipment needed in order to result in a complete and operable system without claim for additional payment, even if such equipment is not listed in this Specification.

E. All work related to this Specification will be completed in a professional manner by fully qualified workers.

1.14 RELIABILITY

A. General

1. The systems are designed to provide professional quality operation over a period of several years without the need for continual maintenance. Equipment that has a high failure rate is not acceptable for installation as part of these systems.

1.15 GUARANTEE

A. During the guarantee period, within 4 hours of notification, the Contractor will answer all service calls and requests for information.

B. During the guarantee period, within 24 hours of original notification, the Contractor will provide emergency service to restore operation of the system, replacing defective materials, repairing faulty workmanship, making temporary repairs, and providing loaner equipment as necessary, all at no charge.

C. The Contractor will take such actions at the time of installation to ensure that all equipment is installed in accordance with the manufacturer recommended environmental and electrical operating conditions and requirements. After installation, the Contractor will be responsible for the repair or replacement of said equipment that the Contractor installs which fails due to environmental or electrical conditions. The Contractor will not be held responsible for damages due to changes in environmental conditions which occur after system acceptance.

D. Unless otherwise directed, the Contractor will activate all manufacturer warranties in The City of New York's name. The start date of the warranties will be the date of substantial completion.

PART 2 - PRODUCTS

2.1 SPACE SUMMARY

A. Community Room

B. Behavior Training Room

C. Digital Signage

D. Small Meeting Room

E. Large Meeting Room

F. Public Address System

2.2 AUDIOVISUAL SYSTEM PRODUCTS:

A. Equipment List
1. All equipment labeled CFIO is to be provided under Contract No 1 (General Construction) and to be installed by others. See Part 2 – Products, 2.1 CFIO Equipment, A. FF&E Schedule in Specification Section 012100.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 POST-INTEGRATION ADJUSTMENTS

A. If so requested by the Commissioner, and within 90 days of system acceptance the Contractor will be prepared to make two visits to the site to make final minor adjustments to the control system code or programming without additional compensation. This could include, but may not be limited to, renaming, or changing the size or location of buttons, page flip calls, or adjustments to code to provide a fully functioning system.

B. The Contractor will be responsible for ensuring that any changes to the control system or control surfaces that occur post integration are appended to the Final System Documentation.

3.3 IDENTIFICATION PANEL

A. An identification panel will be installed within the equipment rack including Contractor details. The panel will be mounted in the top rack space.

3.4 CONTROL SYSTEMS REQUIREMENTS

A. Control System User Interface
   1. All panels are to have the time and date as icons, in the same position on every page.
   2. All panels are to have a title, indicating the piece of equipment and/or functionality being controlled.
   3. No individual component will be programmed to function atypically.
   4. Devices similar in nature will be programmed to operate with a common format.
   5. Pages for source equipment will conform to the following guidelines:
      a. Transport controls should be on the main device page.
      b. The primary transport controls, <Play>, <Stop> and <Pause> should be larger than the other transport controls.
      c. Buttons will include both graphic images and text.
      d. A button will be included for a pathway to device specific controls, including menus and advanced device functions.
      e. A button will be included for a pathway to recording functionality. This will include a single-bus control for the recording source.
      f. Final programming will include capability to remotely control all functions of the audiovisual system. Individual device controls will provide full manufacturer's functionality.
      g. Provide control capability for every function available on every piece of equipment being controlled by the system. Define and provide "macro" commands for the most used functions.
      h. Provide control panel layouts that are consistent from page to page. Whenever the same button appears on more than one page, it will be in the same position on each page.

i. Functions used during a general presentation will be accessible with a minimal amount of button presses/page flips.
j. All power functions, or other destructive commands, activated by the users through the user interface will be intercepted in the programming. The user will be provided with the opportunity to cancel out the command prior to any actions being initiated and without disturbing the current operating model.
k. Where feasible, multi-level access to controls should be implemented. All software will provide multiple levels of password protection. Initially three levels of security will be established and specific rights to program areas will be assigned by user:

1) Level 1 will allow user to operate the system, without a password. Control will be limited to basic functionality directly affecting the space in which the control is located.
2) Level 2 will be password protected and allow user to modify system parameters and features listed in level 1.
3) Level 3 will be password protected, and allow a technician access to set-up functions, source selection, etc.

B. Control System Hardware
1. When a choice of control protocols is available for a piece of equipment, the most secure and flexible one will be used, i.e. RS-232 control, where available, will be used in place of either infra-red or relay control.
2. All equipment utilizing a “toggled” power command are not to be powered on and off from the control system.

3.5 INSTALLATION PRACTICES

A. General
1. A safety factor of at least five or a published safe working limit will be utilized for all brackets, fasteners and attachments.
2. In the installation of cable, consideration will be given not only to operational efficiency, but also to overall aesthetic factors.
3. The Contractor will be obligated to protect completed work and uncompleted work against damage or loss until The City of New York has given final acceptance. Should the need arise to repair work or replace items the Contractor will do so at no cost to The City of New York.

B. Furniture
1. The Contractor will ensure that mounting hardware is compatible with and suitable for installation in furniture specified by the Commissioner. It will further be the Contractor’s responsibility to ensure that such coordination with the Commissioner, or furniture supplier occurs.
2. The Contractor will exchange with and follow such shop drawings as to ensure that dimensions and structural supports are adequate for the installation of specified equipment. It is the Contractor’s responsibility that the request and delivery of such critical coordination information is satisfactorily executed. In as much as the Contractor has control over the delivery of such information, it will deliver it as requested by the Commissioner.

3.6 CABLING

A. Cabling Types
1. Refer to the Audiovisual drawings for minimum audiovisual low-voltage cabling requirements.
2. Coordinate UTP cable types with Information Technology (IT) requirements and submit UTP cable for approval by the Commissioner.

B. Cable Installation
1. Non-contiguous cable support mechanisms such as hangers, rings, and hooks will not be spaced farther than four (4) feet apart. All manufactured raceways used for cables will be installed according to the raceway manufacturer's specifications.
2. Cable runs will be supported with devices designed for this purpose and are to be installed independent of any other structural component.
3. Cables routed vertically up walls, or between floors as vertical riser, will be supported with clamps or other mechanisms. These supports will occur at least three times per floor.
4. The Contractor will maintain, or where not already existing, provide through penetration fire stop systems to prevent the spread of fire through openings made in fire-rated walls or floors to accommodate penetrating items such as conduit, cables or another pathway. Fire stop will restore floor and wall to the original fire rated integrity and will be waterproof. The fire stop systems and products will have been tested in accordance with the procedures of U.L. and material will be U.L. classified as materials for use in through-penetration fire stops.
5. The fire stop system will comply with the NEC and with NFPA 101-Life Safety Code (latest edition) and will be made available for inspection by FDNY prior to cable system acceptance. The Contractor will be responsible for verifying the fire rating of all walls and floors affected by the work.
6. Cable pulling tension may not exceed manufacturer recommendations. Where cable-pulling lubricant is used, the lubricant must be compatible (non-damaging) with the conduit and cable sleeve materials and must not harden over time to prevent future pulls.
7. Cable stapling of any recognized media type will not be permitted.
8. Cables will be dressed in conveniently sized bundles and either laced or banded. Lacing or banding will not be so tight as to deform cable bundles.
9. Cabling installed with a bend radius less than that recommended by the cabling manufacturer is not acceptable.
10. Cables and bundles terminating at equipment or connector panels will be supported so as not to put strain on connections or connectors.
11. All cables, with the exception of video or pulse cables, which must be cut to an electrical length, will be cut to the length dictated by the run. No splices will be permitted in any pull boxes without prior approval of the Commissioner.
12. Cabling for equipment mounted in drawers or on slides will be provided with a service loop of appropriate length. A cable management support for the service loop will be provided to prevent the service loop travel from interfering with the operation of the drawer or slide or snagging on adjacent cabling.
13. Where indicated on the Audiovisual Drawings microphone level, line level, loudspeaker level, and video lines will be run in separate conduits, trough, raceway divider, and cable bundles. Low voltage DC and control may be run along with any signal types other than microphone or line level runs.

C. Termination
1. All termination components must meet or exceed all specifications for given media type and application as described in this document and system drawings.

2. Crimp on connectors will be installed only on the appropriate size cable using the manufacturer recommended crimp tool and die set.
3. Connections to electronic devices providing screw terminals will be terminated using the appropriate gauge insulated spade or ring crimp terminal connector and crimp tool.
4. All mechanical solder-on connectors will be attached to cable ends using rosin core solder.
5. Audio signal cable shields will be protected with the appropriate gauge Teflon or heat-shrinkable tubing. The jacket end of each audio cable will be fitted with the appropriate gauge heat shrinkable tubing to provide additional protection to the base of the shield or shield foil. This also applies to the inside of mechanical connectors and cables that terminate at partitioned barrier strips.

D. AV Over UTP Cabling System

1. In some areas, analog video, audio, and control signals will be transmitted over a dedicated system of unshielded twisted pair (UTP) cabling utilizing specialized electronics. UTP transceivers located in the presentation spaces will connect to similar devices in the equipment racks via a cabling scheme comprised of RJ-45 receptacles, permanently installed cabling, equipment cords, and patch cords and patch panels.
2. Each AV over UTP port receptacle, permanently installed cable, equipment cord, patch cord and patch panel will be of a color or have markings that are non-standard with the voice/data system and be plainly and permanently labeled (AV ONLY - NOT DATA).
3. To eliminate the problem of skew caused by the varying pair lengths inherent with CAT-5e/6 UTP cabling, a specialized skew-free UTP bulk cable, patch cables, and equipment cords are specified.
4. The Contractor will test, verify and document the length and wire map of each Permanent Link cable run, each patch panel to transceiver cable segment, and each patch and equipment cord using one of the following products:
   a. Fluke model 620 LAN Cable Meter.
   b. Trend Networks model R156006 LAN cable tester
   c. Fluke DSX Cable Analyzer
   d. OR approved equal

3.7 GROUNDING

A. General

1. To avoid system noise, data errors, safety hazards, and equipment damage, all devices and cabling will be installed using a consistent grounding scheme. All devices will be grounded and all ground conductors will follow a star topology. The grounding system topology should be such that each equipment rack and each piece of signal bearing equipment is connected so that there is never more than a single path to ground. This section offers guidelines for grounding and shielding methodology. Grounding and shielding methodology may need to be augmented or modified for certain pieces of equipment or interconnections in order to meet the requirements of other sections of this specification. The Contractor will be responsible for making necessary alterations in accordance with industry practices and such that the Performance Standards detailed in 'Performance Standards' are met.
2. Under no circumstances will an AC neutral conductor be used to ground equipment.
3. Refer to the International Communications Industries Association, Inc. (InfoComm International) Basics of Audio and Visual Systems Design handbook, Section 10, Technical Power and Grounding Systems for additional guidelines.

B. Interconnection

1. All connectors used on system I/O panels will be electrically isolated from the panel and provide a pass through (uninterrupted) ground connection.
2. Microphone cable shields will be connected to the microphone frame and grounded only at the preamplifier input connector.
3. All audio interconnections with cable lengths greater than 10 feet will use balanced (symmetrical) signaling.
4. All audio signal cable shields will be grounded only at the input connection of each device. Signal cable shields, both connected to devices and floating, will be protected by the appropriate gauge heat shrinkable tubing. Shields at the output connector will be folded back over the cable jacket and covered with heat-shrinkable tubing. Do not cut off unused shields.
5. Coaxial video and RF shields will be connected at both ends.

C. Pull Strings
1. A nylon pull string will be left in every conduit. In the event additional cables are pulled in after the initial cable pull, a nylon pull string will be pulled with the added cable.

3.8 PERFORMANCE STANDARDS

A. Audio
1. Polarity
a. Absolute signal polarity will be maintained throughout the signal chain such that a positive signal at the input produces a corresponding positive excursion at the loudspeakers.

2. Electronics
a. The audio system electronics will deliver the following minimum performance standards as measured from all source inputs for microphones, audio tape machines, video tape machines, etc., through all mixers, audio distribution amplifiers, routers, etc., to all audio signal destinations.

1) Frequency Response: ±0.5dB, 20-20,000 Hz.
2) Hum and Noise: -70 dB, 20-20,000 Hz, un-weighted.
3) Distortion: 0.1% THD, 20-20,000 Hz

3. Speech Signal
a. The system will provide a speech signal in the audience seating area that meets or exceeds the following requirements:

1) Frequency response within +/- 3 dB from 500 Hz to 15,000 Hz.
2) Overall SPL variance of +/- 3 dB.
3) Measured Alcons of 10% or lower.
4) Maximum average SPL of 85 dB (flat), with 10 dB of undistorted headroom available.

4. Music Signal
a. The system will provide a music signal in the audience seating area that meets or exceeds the following requirements:

1) Frequency response within +/- 3 dB from 200 Hz to 17,000 Hz.
2) Overall SPL variance of +/- 3 dB.
3) Maximum average SPL of 90 dB (flat), with 10 dB of undistorted headroom available.

B. Optical
1. All video projection systems will meet the following performance standards:

a. The total averaged light output from a video projector, in ANSI lumens, will be tested by the Contractor and certified to be within ±15% of that specified by the projector manufacturer.

3.9 SYSTEM SETUP AND TUNING

A. Optimization
1. The Contractor will configure, adjust, program, and calibrate all components in order to optimize the performance of all individual subsystems and the system as a whole.

3.10 PRELIMINARY TESTS AND SUBMITTALS

A. General
1. Once the system is installed, the Contractor will complete the following preliminary tests and prepare a written test report for the Commissioner. The test report will list the results of each of the tests described in this section and certify that the installation is complete

B. Audio
1. Prior to the termination of audio amplifiers to speakers, the Contractor will measure the resistance of the speaker line with reference to ground to determine that no short circuits or paths to ground exist in the line. The Contractor will connect the speaker to the cable and measure the impedance of each speaker line using a 1,000Hz signal applied to the line. The Contractor will submit a list to the Commissioner, by cable number, of the impedance of each speaker line. This test will be performed with the amplifier disconnected from the speaker line and the speaker connected to the speaker line.
2. Verify all loudspeakers are working.
3. Verify that all microphones are working and operational with no perceived feedback from loudspeaker system.
4. Verify that the system meets all Performance Standards as outlined in 'Performance Standards'.
5. Verify that all equipment, panels, and cables are labeled correctly.
6. Verify each item of equipment is functioning as intended.
7. Verify the installation is the same as specified.

C. Video
1. To establish that the facility cabling, and terminations meet industry standard specifications, a video test signal will be applied to each input cable and passed through the system switching and distribution networks with the results measured at each system output.
2. In addition, the Contractor will:
   a. Verify each item of equipment is functioning as intended.
   b. Verify the installation is the same as specified.

D. Computer Video Display Devices
1. The Contractor will use a computer-video test generator to establish that computer video capable displays such as flat panel, and projection devices are in good working order and optimally adjusted. The computer-video test generator will be capable of outputting test signals on HDMI, DVI-I, DisplayPort, 5 BNC connectors, 9-pin TTL connector, 15-pin HD VGA connector, or 15-pin D Macintosh connector. The computer-video test generator will offer the following test patterns:
   a. Test Patterns

1) Dots 12x16, Alternating pixels
2) Vertical/Horizontal Crosshair
3) Crosshatch 12x16
4) Crosshatch 24x32
5) Flat Field
6) Checkerboard 100% (IRE) White
7) Checkerboard 56% (IRE) White
8) Checkerboard 14% (IRE) White
9) 8 Level Split Gray Scale
10) 8 Vertical Color Bar
11) 16 Color Bar
12) SMPTE and PLUGE Color Bar

E. Control
1. Upon completion of installation, the Contractor will test each function of each control station, push-button panel, touch screen panel, computer control interface, and all components connected to or interfaced to the Control System to verify proper operation and that each switch and indicator operates as intended.

3.11 FINAL TESTS

A. Upon approval of the Contractor's test report, and at a time that is acceptable by the Commissioner, the Contractor will assist in final system tests and adjustments. The Contractor's representatives assisting in the performance of these tests will be thoroughly familiar with the details of the system and will include the field supervisor responsible for installing the system.

B. To demonstrate the good working order of all playback devices in the system, the Contractor will make available high-quality source materials for all audio and video media types represented in the system. To demonstrate the good working order of all computer-video displays, the Contractor will make available the computer-video signal generator described in other Part 3 Articles In addition, the Contractor will make available a computer graphics signal generator or portable computer with the ability to output all video formats natively supported by the Audiovisual system specified. The portable computer will be capable of displaying spreadsheets, graphs, charts, pictures and text of varying sizes and fonts to effectively demonstrate the systems computer display imaging capabilities.

C. The Contractor will:
1. Load source material into all input sources and the laptop computer.
2. Switch randomly between all sources and demonstrate that all functions of the control system are working properly and tracking correctly.
3. Demonstrate that the displays have been optimized for all sources.
4. Demonstrate that the system meets the criteria as outlined in ‘Performance Standards’.

3.12 SOFTWARE

A. Where custom software is developed as part of this project, the system source code and any associated related files, referenced files, and development software (and all relevant documentation and license) used

to compile, develop, and build, etc. the executable code must be provided to The City of New York only.

B. The source code should be well documented in accordance with industry software engineering practices.

C. If a Subcontractor is used to write the software, the Contractor will include, as part of the Final Documentation submittal, a signed letter on Subcontractor letterhead, granting The City of New York ownership, use, and modification rights of the code and documentation as defined herein. The software will be provided to The City of New York as part of the Final Document Submittal.

D. Copies of all manufacturer software required to program, compile, load and adjust audiovisual hardware settings or programming will be provided.

E. Copies of the current firmware and/or hotfix versions for all equipment with programmable firmware.

3.13 DELIVERY & APPROVAL

A. Unless otherwise arranged, The Contractor will prepare and submit one complete set of the Final Documentation to the Commissioner for review at the time of Final Tests. The package will include all of the documentation listed above and be in the exact form and format intended for delivery to the facility.

3.14 INSTRUCTION

A. The Contractor will provide a minimum of 8 hours of on-site instruction for (but not limited to) staff at a time that is mutually agreeable for the Commissioner and Contractor.

B. The Contractor will provide an additional minimum of 2 hours of digital signage system initial template layouts, instruction and configuration, if applicable.

C. Contractor will provide (1) additional day for system walk through etc. at the request of the Commissioner

D. As part of user instruction Contractor will provide single page laminated room use cards for all rooms and tailored to each specific room type. Room card will include:

1. Simple instructions for basic user functions (system on, off, media, making VTC & ATC calls).
2. Help desk contact information.
3. Room type capabilities (presentation, VTC, ATC, etc.)

E. Electronic version of the room use cards will be provided to the Commissioner.

END OF SECTION 27 41 16

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 SUMMARY

A. Section Includes:

1. Provide labor, materials and equipment necessary to complete the work of this Section, including to the following:
    a. Provide labor, materials and equipment necessary to complete the work of the Electronic Safety and Security (ESS) Systems, including:
    b. Grounding and bonding for Electronic Safety and Security (ESS).
    c. Pathways for ESS.
    d. Lightning and Surge Protection for ESS.
    e. Vibration and Seismic Controls for ESS.
    f. Equipment Enclosures for ESS.
    g. Electronic Components for ESS.
    h. Exposed Components.
    i. Cables for ESS.
    j. Identification for ESS.
    k. Electronic Safety and Security (ESS) equipment coordination and installation.
2. The Electronic Safety and Security (ESS) Systems include:
    a. Access Control System (ACS)
    b. Video Surveillance System (VSS).
    c. Associated cabling, enclosures and uninterruptible power supplies.
    d. Coordination:
        1) Coordination with door hardware
        2) Coordination and interface with the fire alarm system to tie the electrified locks power supplies to the building fire alarm
        3) Coordination with other trades

B. Related Sections:

1. Section 08 71 00 “Door Hardware”
2. Section 26 05 26 “Grounding and Bonding for Electrical Systems”
3. Section 26 05 29 “Hangers and Supports for Electrical Systems”
4. Section 26 05 33 “Raceways and Boxes for Electrical Systems”
5. Section 28 10 00 “Access Control”
6. Section 28 20 00 “Video Surveillance”

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. List of Submittals:

1. Pre-Construction Submittals:

a. Qualifications and Certificates
b. Product Data for every product installed
c. Manufacturer quality assurance tests and source quality control reports
d. Shop drawings
e. Samples

2. During Construction:

a. Coordination Drawings
b. System Labeling

3. Post Construction:

a. Test Plan and Procedures
b. Field Quality Control Reports/Test Results
c. Record (as-built) Drawings
d. Manuals
e. Warranties

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and standard colors and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories. It must also include roughing-in diagrams and templates, standard wiring diagrams, controls and performance curves. Where Product Data must be specially prepared or modified because standard printed data is not suitable for use, submit as “Shop Drawings”.

C. Samples: Along with project data and shop drawings, submit one (1) sample for each exposed security devices and security devices with color and finish options, for review by the Commissioner. The Commissioner will retain these devices as record of the approved equipment for the length of the project.

D. Shop Drawings:

1. The shop drawing submittals must include highly detailed, to-scale, drawings describing the products (systems, equipment, devices and materials) and services as to precise locations, mounting and installation methods, details and dimensions, schedules, conduit sizing, conduit routing, riser diagrams, point-to-point interconnect diagrams, equipment schedules, zoning schedule, door schedules, VSS camera schedules, system interface schedules or diagrams, power requirement schedules, stand-by/emergency power schedule, cost reports, and such other diagrammatic or written descriptions which must allow a thorough and accurate understanding of the security systems and equipment that are being furnished, how they are intended to function, how they will be installed, and all other necessary information of similar intent.

2. Illustrate all mounting locations and methods, with particular detail for the installation of intrusion sensors, locking hardware, and request-to-exit devices at doors, sensors located at windows and the mounting of interior and exterior VSS cameras.

3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

4. Equipment schedules and details must provide the following information, as appropriate in each case: door number; door type; door position switch; request-to-exit type; request-to-exit location; auxiliary request-to-exit device, if any; lock type; power requirements; emergency power; access control type; special installation requirements; timed-shunt times; shunt type; precise, to-scale mounting location; zone or point designation; remote control of lock by specific and designated control console; VSS camera number activated by sensor or switch closure; input/output programming schedules; CPU output reports structure.

5. Camera schedules and details must provide the following information: camera number, camera type, monitor number for each camera sequencing, camera model number, camera features, such as auto-iris; lens specification, power requirements, type of power input, cable type, length of cable run, camera mounts, camera housing; camera housing features (such as heater, etc.), camera drives, switcher position, switcher type, monitor type, cameras displayed on each monitor, especially linked displays, Network Video Recorder (NVR) positions, alarm queuing; special installation or carpentry requirements; camera and/or lens controls; alarm homing; termination method; lightning, ground loop, etc. protection.

6. Clearly illustrate the fields of view of each camera. If the camera is capable of wide-angle and telephoto viewing, both fields of view must be indicated. The camera “aiming point” must be indicated. The submittal must clearly identify outdoor cameras mounting details and maintenance access concepts and design.

7. System interface schedules or diagrams must clearly identify sensors and switches which queue cameras, as well as the number of cameras activated; NVR activation logic; VSS monitor switching logic; interfaces between the access control system; distributed processing capabilities and functions; sensors and switches exclusively used as request-to-exit devices.

E. System labeling: submit labeling scheme and samples.

F. Manuals:

1. Prior to substantial completion, complete sets of Operation, Maintenance and Service Manuals must be submitted for systems and equipment provided under this contract.

2. The manuals must be compiled, assembled and indexed, in an easily identifiable hard cover form. Three (3) sets of the manuals must be submitted prior to final acceptance testing.

3. The manuals must include the following:

   a. Complete operating instructions.
   b. Complete maintenance instructions, wiring diagrams, troubleshooting instructions.
   c. System service instructions for work which manufacturers recommend user service.
   d. Complete parts lists for each major item of equipment and/or for each system.
   e. Complete collection of manufacturers' product and catalog literature for equipment and systems installed under this contract.

f. Manufacturers' warranties.
g. Operating characteristics, performance data, ratings, and manufacturers' specifications for each item of equipment or system.
h. Internal wiring diagrams and schematics.
i. Name, address, and telephone number for service for each item of equipment or system.
j. Software User Documentation: Manual must include operating instructions, programming instructions, technical documentation and maintenance procedures to permit making changes to system configuration.

G. Warranties

1. Provide minimum 1-year manufacturer warranty for the systems installed.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Unless otherwise specifically noted, all equipment, material and articles to be installed must be new, best of their respective kinds, free from defects, listed by Underwriter's Laboratories for the intended use, bearing their label and of the most suitable grade for the purpose intended.

C. Installers must be properly trained by the manufacturers of the security systems installed.

D. 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.

E. Grounding: Comply with ANSI-J-STD-607-A.

F. Qualification Requirements

1. Installer must be properly trained by manufacturer of the systems installed.

1.6 COORDINATION

A. Coordinate layout and installation of security equipment in the IDF/IT room(s) copper and/or fiber backbone and LAN requirements with the Commissioner and the Structured Cabling System (SCS) installer.

B. Meet jointly with the Commissioner to exchange information and agree on details of equipment arrangements and installation interfaces.

C. Record agreements reached in meetings and distribute them to other participants.

D. Coordinate location of power raceways and receptacles with locations of security equipment requiring electrical power to operate.

E. Coordinate arrangement, mounting, and support of electronic safety and security equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. Connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

F. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

G. Coordinate location of access panels and doors for electronic safety and security items that are behind finished surfaces or otherwise concealed.

H. Coordinate routing of the security cables.

I. Coordinate the installation of the door/frame security package with the door hardware supplier.
Security door hardware includes an electrified lock, electric strike, electrified panic hardware, electric power transfers or electrified hinges, magnetic door contacts, lock power supplies, termination cabinets, and final connection of wiring to door security devices and to the appropriate screw terminals on the screw-type termination strips located in the termination box.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING FOR SECURITY SYSTEMS

A. Comply with Section 260526 Grounding and Bonding for Electrical Systems .

B. Comply with ANSI-J-STD-607-A.

2.2 PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY

A. Hangers and Supports

1. Cable Support: NRTL labeled.
2. Comply with NFPA 70 and UL 2043 for fire-resistant and low-smoke-producing characteristics.
3. Cable hangers and non-continuous supports must be engineered to prevent degradation of cable performance and pinch points that could damage cable. Cable tie slots fasten cable ties to brackets.
4. Must have various attachment options for: wall, ceiling, joist, beam, flange, raised floor pedestal and other types of mounting.
5. Support brackets with cable tie slots for fastening cable ties to brackets.
6. Lacing bars, spools, J-hooks, and D-rings, straps and other devices.
7. Cable straps (ties) must be reusable with hook and loop or d-ring, available in various colors and sizes. Plenum rated straps must be used in plenum spaces.
8. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. ERICO Caddy.
    b. Eaton B-Line
    c. Panduit
    d. Or approved equal

B. Conduits and Back Boxes:

1. Provide where indicated on drawings or as required.
2. Conduit and boxes sizes as shown on the communications drawings.
3. Refer to Section 26 05 33 "Raceway and Boxes for Electrical Systems.
4. Flexible metal conduit must not be used unless specifically noted.

C. Sleeves for Pathways and Cables

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise indicated.

D. Sleeve Seals and Firestopping

1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
2. Comply with requirements Section 07 84 13 "Penetration Firestopping".
3. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
4. Sealing Elements: Interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
5. Pressure Plates: Stainless steel. Include two for each sealing element.
6. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.
7. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. Pipeline Seal and Insulator, Inc.
   d. Hilti
   e. Or approved equal

2.3 LIGHTING AND SURGE PROTECTION

A. Intrusion detection, access monitoring and control, video circuitry, and communication circuits that connect to outdoor mounted equipment must be protected at both ends against excessive voltages.

B. This requirement must apply for circuits that are routed both in underground conduits and overhead runs. As a minimum, both primary detection devices, such as three (3) electrode gas-type surge arrestor, and secondary protectors must be installed to reduce dangerous voltages to levels that will cause no damage. Fuses must not be permitted as lightning and power surge protection devices.

C. Provide fail-safe gas tube type surge arrestors on all exposed security data circuits. Breakdown voltage for the unit must be three-hundred to five-hundred (300-500) VDC. The unit must have equal performance for bi-polar operation with an automatic reset feature, and a minimum life of one thousand (1000) surges with ten (10) times one-thousand (1000) microsecond wave-form at one-thousand (1000) amperes.

2.4 VIBRATION AND SEISMIC CONTROLS FOR ESS

A. Security systems components must withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. The term “withstand” means “the unit will remain in place without separation from any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event”.

C. Equipment must be seismically rated and braced according to IBC 1621.

2.5 IDENTIFICATION FOR SECURITY ESS

A. The identification for the communications systems must meet all the requirements of a Class 3 facility as defined by ANSI/TIA/EIA 606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

B. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Identify all the components of the security systems.

D. For fire-resistant plywood, do not paint over manufacturer's label.

E. All labels must be preprinted or computer-printed type.

F. Type, format, wording, printing, and placement of labels must be coordinated with the Commissioner

G. Labeling System

1. PC-based software, capable of supporting alpha numeric characters and True Type Fonts.
2. Compatible with laser printers.
3. Label sizes supported:
4. Minimum: 0.8" W x 0.2" H.
5. Maximum: 3.0" W x 12.0" H.

2.6 EQUIPMENT ENCLOSURES FOR ESS

A. Cabinets or housings, power supply enclosures, terminal cabinets, multiplexer, data gathering panels, wiring gutters, and other component housings, collectively referred to as enclosures, must be so formed and assembled as to be sturdy and rigid.

B. Thickness of metal in cast and sheet metal enclosures of all types must not be less than those in Tables I and II, UL six-hundred-eleven (UL-611). Sheet steel used in fabrication of enclosures must be not less than fourteen (14) gauge. Doors and covers must be flanged. Where doors are mounted on hinges with exposed pins, the hinges must be of the tight pin type or the ends of hinge pins must be tack welded to prevent ready removal. Doors having a latch edge length of less that twenty-four (24) inches must be provided with a single lock. Where the latch edge of a hinged door is twenty-four (24) inches or more in length, the door must be provided with a three (3)-point latching device with lock; or alternatively with two (2) locks, one (1) located near each end.

C. Any ventilator openings in enclosures and cabinets must conform to the requirements of UL-611.

D. Unless otherwise indicated, sheet metal enclosures, excluding control console enclosures, must be designed for wall mounting with top holes slotted. Mounting holes must be in positions which remain accessible when all major operating components are in place and the door is open, but must be inaccessible when the door is closed. Covers of pull and junction boxes provided to facilitate initial installation of the system must be held in place by tack welding, brazing, or one-way screws. Zinc labels must be affixed to such boxes indicating they contain no connections. These labels must not indicate that the box is part of the security system.

E. Excluding the cabinets and other enclosures located in Security or Telecommunications Rooms, all enclosures, cabinets, housings, boxes, raceways, and fittings of every description having hinged doors or removable cover plates which contain circuits of the security system and its power supplies, must be provided with cover-operated corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door is moved as little as one quarter (1/4) inch from its normally closed position.

2.7 EXPOSED COMPONENTS

A. Components exposed and accessible to the public must be of a design and construction typical and suitable for such use. All device fasteners must be an approved security type. All components and materials must be resistant to vandalism and waterproof.

2.8 ELECTRONIC COMPONENTS FOR ESS

A. All electronic components of the system must be of the solid-state type, mounted on printed circuit boards conforming to UL 796. Boards must be plug-in, quick-disconnect type. Circuitry must not be so densely placed as to impede maintenance. All power dissipating components must incorporate safety margins of not less than twenty-five (25) percent with respect to dissipation ratings, maximum voltages, and current-carrying capacity. All electronic printed circuit boards furnished and installed must be provided with a mildew/fungus-resistant and moisture inhibiting coating.

2.9 CABLES FOR ESS

A. All cables installed in plenum spaces must be plenum rated.

B. Jacket color must be yellow for all security cables.

C. Composite Cable:

1. Element 1 (Lock Power): 18 AWG, 4 Conductor Non-Shielded Plenum
2. Element 2 (Card Reader): 22 AWG, 3 Pair Overall Shielded Plenum
3. Element 3 (Door Position Switch): 22 AWG, 2 Conductor Non-Shielded Plenum
4. Element 4 (Request to Exit Device): 22 AWG, 4 Conductor Non-Shielded Plenum

D. PVC-Jacketed, RS-232 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, and individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage; PVC jacket. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.

1. Plenum-Type, RS-232 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, and individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage; plastic jacket. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
2. NFPA 70, Type CMP.
3. Flame Resistance: NFPA 262 Flame Test.

E. PVC-Jacketed, RS-485 Cable: Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, PVC insulation, unshielded, PVC jacket, and NFPA 70, Type CMG. RS-485 communications require 2 twisted pairs, with a distance limitation of 4000 feet.

1. Plenum-Type, RS-485 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and fluorinated-ethylene-propylene jacket.
2. NFPA 70, Type CMP.
3. Flame Resistance: NFPA 262 Flame Test.

F. Multiconductor, PVC Readers and Wiegand Keypads Cables: No. 22 AWG, paired and twisted multiple conductors, stranded (7x30) tinned copper conductors, semirigid PVC insulation, overall aluminum foil-polyester tape shield with 100 percent shield coverage, plus tinned copper braid shield with 65 percent shield coverage, and PVC jacket.

1. NFPA 70, Type CMG.
2. Flame Resistance: UL 1581 Vertical Tray.
3. For TIA/EIA-RS-232 applications.

G. Paired PVC Readers and Wiegand Keypads Cables: Paired, 3 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, individual aluminum foil-polyester tape shielded pairs each with No. 22 AWG, stranded tinned copper drain wire, 100 percent shield coverage, and PVC jacket.

1. NFPA 70, Type CM.
2. Flame Resistance: UL 1581 Vertical Tray.

H. Paired PVC Readers and Wiegand Keypads Cable: Paired, 3 pairs, twisted, No. 20 AWG, stranded (7x28) tinned copper conductors, polyethylene (polyolefin) insulation, individual aluminum foil-polyester tape shielded pairs each with No. 22 AWG, stranded (19x34) tinned copper drain wire, 100 percent shield coverage, and PVC jacket.

1. NFPA 70, Type CM.
2. Flame Resistance: UL 1581 Vertical Tray.

I. Plenum-Type, Paired, Readers and Wiegand Keypads Cable: Paired, 3 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, individual aluminum foil-polypropylene tape shielded pairs each with No. 22 AWG, stranded tinned copper drain wire, 100 percent shield coverage, and fluorinated-ethylene-propylene jacket.

1. NFPA 70, Type CMP.
2. Flame Resistance: NFPA 262 Flame Test.

J. Plenum-Type, Multiconductor, Readers and Wiegand Keypads Cable: 6 conductors, No. 20 AWG, stranded (7x28) tinned copper conductors, fluorinated-ethylene-propylene insulation, overall aluminum foil-polyester tape shield with 100 percent shield coverage plus tinned copper braid shield with 85 percent shield coverage, and fluorinated-ethylene-propylene jacket.

1. NFPA 70, Type CMP.
2. Flame Resistance: NFPA 262 Flame Test.

K. Paired Lock Cable: 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.

1. NFPA 70, Type CMG.
2. Flame Resistance: UL 1581 Vertical Tray.

L. Plenum-Type, Paired Lock Cable: 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.

1. NFPA 70, Type CMP.

2. Flame Resistance: NFPA 262 Flame Test.

M. Paired Lock Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.

1. NFPA 70, Type CMG.

2. Flame Resistance: UL 1581 Vertical Tray.

N. Plenum-Type, Paired Lock Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and plastic jacket.

1. NFPA 70, Type CMP.

2. Flame Resistance: NFPA 262 Flame Test.

O. Paired Input Cable: 1 pair, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, overall aluminum foil-polyester tape shield with No. 22 AWG, stranded (7x30) tinned copper drain wire, 100 percent shield coverage, and PVC jacket.

1. NFPA 70, Type CMR.

2. Flame Resistance: UL 1666 Riser Flame Test.

P. Plenum-Type, Paired Input Cable: 1 pair, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, aluminum foil-polyester tape shield (foil side out), with No. 22 AWG drain wire, 100 percent shield coverage, and plastic jacket.

1. NFPA 70, Type CMP.

2. Flame Resistance: NFPA 262 Flame Test.

Q. Paired AC Transformer Cable: 1 pair, twisted, No. 18 AWG, stranded (7x26) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.

1. NFPA 70, Type CMG.

R. Plenum-Type, Paired AC Transformer Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and plastic jacket.

1. NFPA 70, Type CMP.

2. Flame Resistance: NFPA 262 Flame Test.

S. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belden.
2. West Penn Wire.
3. Superior Essex.
4. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 REQUIREMENTS FOR SECURITY EQUIPMENT INSTALLATION

A. All materials must be installed as per the manufacturers' instructions, unless noted otherwise.

B. Comply with NECA 1.

C. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

D. 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.

E. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications' equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

F. Right of Way: Give to piping systems installed at a required slope.

G. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

H. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

I. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

J. Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely, paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore all surfaces to their original condition.

K. All wall-mounted equipment must be mounted square and plumb.

L. Complete work according to the agreed upon schedule. Cooperate in coordinating your activities with other planned and ongoing work at the site in a manner that facilitates meeting the schedule. This includes coordination with the various trades in determining work schedules and in resolving physical installation issues.

M. Take all necessary safety and health precautions to protect the project, its workers, and the public. OSHA regulations must be followed.

N. Participate in meetings covering technical, installation, and coordination issues.

O. Perform all work required under this specification in a skillful and professional manner in accordance with standards and practices documented and/or accepted by industry, such as the ANSI/TIA/EIA, NECA standards and codes. The security technicians must be familiar with the proper assembly and installation of all components they are working with and must follow manufacturer's specific installation requirements.

P. Provide all tools needed to perform its required work.

Q. Order all components in a timely manner so that installation dates are not compromised. Materials must either be on hand, or available on short notice, so that the installation may be expedited if required, or if the opportunity to do so presents itself.

R. Ensure that any excess materials are ordered for the project they are kept in their original condition and packaging for restocking.

3.3 ENCLOSURES FOR ESS

A. All enclosures that are not installed in a secured space, such as Security Room/Closet or Telecommunications Rooms, must have tamper provisions:

B. Tamper switches must be mechanically mounted to maximize the defeat time when enclosure covers are opened and removed. The minimum amount of time required to depress or defeat the tamper switch after opening or removing the cover must be greater than one (1) second.

C. Enclosure and tamper switch must function in such a manner as to not allow direct line of sight to any internal components or the tampering of the switch or circuit wiring. Tamper switches must be inaccessible until the switch is activated; have mounting hardware concealed so that location of the switch cannot be observed from the exterior of the enclosure; be under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; must be spring-loaded and held in the closed position by the door protected; and must be wired so that they break the circuit when the door is disturbed.

D. Tamper switches on doors which must be opened to make normal maintenance adjustments to the system and to service the power supplies must be of the push/pull set, automatic-reset type. Covers of pull and junction boxes provided to facilitate initial installation of the system need not be provided with tamper switches.

3.4 ALARM ANNUNCIATION

A. Alarm annunciation must include intrusion detection, tamper, fail safe, line fault, and power loss.

B. Intrusion Detection: Intrusion detection alarms must include the full range of interior point protection sensors, volumetric space, access control protection sensors, and duress alarms. Duress alarms must be annunciated to clearly distinguish them from other intrusion detection alarms.

C. Tamper: Enclosures, cabinets, housings, boxes, raceways, and fittings having hinged doors or removable covers and which contain circuits for the security system and its power supplies, must be provided with cover operated, corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door or cover is moved as little as one quarter (1/4) inch from the normally closed position. Tamper switches must be mechanically mounted to maximize the defeat time when enclosure covers are opened or removed. The minimum amount of time required to depress or defeat the tamper switch after opening or removing the cover must be one (1) second. Enclosure and tamper switch must prevent direct line of sight to any internal components and prevent switch or circuit tampering. Tamper switches must be inaccessible until the switch is activated; conceal mounting hardware so that location of the switch cannot be observed from the exterior of the enclosure; be under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; must be spring-loaded and held in the closed position by the door or cover protected; and must be wired to break the circuit when the door or cover is disturbed. Tamper switches on doors which must be opened to make normal maintenance adjustments to the system and to service the power supplies must be of the push/pull set, automatic reset type. Tamper alarms must be annunciated to be clearly distinguishable from intrusion detection alarms.

D. Fail-Safe Alarms: Provide a fail-safe capability in all critical elements of the system. Fail-safe is defined as the capability to monitor for proper system functions and to report an alarm when a failure is detected in any critical system function. This must include, but not be limited to, the capability to monitor communication link integrity and to provide self-test. When diminished functional capabilities are detected, the system must provide annunciation of the fault. Fail-safe alarms must be annunciated to clearly distinguish them from other types of alarms.

E. Fail-Safe Locking: All locking must be fail-safe to the extent that such locking is permitted. Fail-safe locking must be understood to mean that upon failure, locks must fail in the "unlocked" and "unsecured" position. All locking must be interconnected into the building's fire alarm system and, upon activation of the fire alarm system, must immediately "unlock" to permit emergency egress from the building. Coordinate all interface requirements with the fire alarm system and furnish and install the necessary interface relays and interconnecting wiring, conduits, and mounting hardware, etc. to effect this operation.

F. Line Fault: As a minimum, fault isolation at the systems level must have the same geographic resolution as provided for intrusion detection. The communication links of the security system must have an active mode for line fault detection. Active mode is defined as that in which some type of signal is continuously sent across the link, resulting in simple link breaks being readily detected. The system must be either a static system or a dynamic system. In a static system, the "no-alarm" condition must always be represented by the same signal, which must be different than the signal originally transmitted. The dynamic system must represent "no-alarm" with a signal which continually changes with time.

G. Power Loss: Provide the capability to detect when any critical component of the system experiences loss of primary power and/or is switched over to either emergency power or uninterruptible power and to declare an alarm. The alarm must clearly annunciate the identity of the component experiencing the power loss.

3.5 GROUNDING AND BONDING

A. Refer to Section 26 05 26 "Grounding and Bonding for Electrical Systems".

B. Comply with ANSI-J-STD-607-A.

C. All cabling used to bond grounds are to be tagged with labels with the point of origin i.e. going to/coming from, with printed labels.

3.6 PATHWAYS INSTALLATION FOR SECURITY SYSTEMS

A. Comply with NECA 1.

B. Comply with Section 26 05 33 "Raceways and Boxes for Electrical Systems".

C. All conduits must be electrical metallic tubing (EMT), except where otherwise noted. Exceptions must be requested in writing as appropriate, such as for different conduit types for various classes of construction, such as for cast-in-place concrete, and placement in cable ducts. Minimum size of conduit must be three quarter (3/4) inch. Connections must be threadless type fittings or couplings.

D. Submit conduit and wire layout drawings showing circuit numbers, wiring and conduit routings for approval by the Commissioner prior to the initiation of Work. Shop drawings of the security systems conduit routing must be coordinated with fire wall construction, mechanical duct work, structural components, fire protection, and plumbing.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Care must be taken to ensure that access to other building components (e.g., air conditioning ducts) is not restricted by cable pathways.

G. Cable management and support hardware must be UL listed for use in the environments in which they will be employed.

H. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.

I. Secure conduits to backboard when entering room from overhead.

J. Extend conduits 3 inches above finished floor.

K. Provide metal conduits with grounding bushings and connect with grounding conductor to grounding system.

L. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

M. Pathways must be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Changes in direction of runs must be made with symmetrical bends or cast metal fittings.

N. All conduits must be affixed or supported at intervals and using prescribed methods and devices in accordance with governing codes. No run of conduit between outlets or fittings must contain more than four quarter bends (360 degrees). Bends must be made such that the conduit will not be injured and that the interval diameter will be effectively reduced.

O. All conduit connections must be tight so as not to create intermittent loss of ground protection. All cut ends entering into fittings must be reamed smooth or have a bushing inserted to prevent damage to wire insulation.

P. Conduit, raceways and other pathways must be kept at least six inches from uninsulated flues, steam pipes or any pipe containing a hot gas or liquid. So far as practical, avoid traps and dips in conduit runs, which might collect moisture.

Q. Strict attention must be given to all conduits containing fiber optic cabling to ensure that manufacturer's recommended conduit bend radii limitations/restrictions are followed.

R. Where conduits connect to sheet steel enclosures, they must be fastened with two (2) locknuts where insulating bushings are used. Bushings must be installed on ends of all conduits where they terminate in pull boxes, outlet boxes, cabinets, etc. and must be of the insulating type and must be securely fastened with locknuts on each side. Crushed or deformed conduits must not be installed. Bushings must not be used as locknuts. Open ends must be sealed around security conductors to be liquid tight using an approved air-drying sealer after capping ends with insulated bushings.

S. Conduits crossing expansion joints in concrete slabs must be provided with suitable expansion fittings, or other suitable means, to compensate for building expansion and contraction. Conduits traversing hazardous areas must use the penetrations and fittings shown on the drawings and provided under other sections of the contract. Seal the fittings subsequent to verifying the integrity of the contained conductors.

T. Pathways must not block ceiling or equipment access doors. Where conduit or raceway is passed through walls, floors, ceilings or roofs, annular space must be sealed or patched. Openings in firewalls and all corridor walls must be sealed with mineral wool or an approved silicone sealant.

U. No pathways must be fastened to other pipe or conduit or installed so as to prevent the ready removal of other pipe or conduit for repairs.

V. Conduit, panels, devices and boxes must be secured by means of shields in concrete, machine screws on metal surfaces and wood screws on wood construction material. Threaded studs driven in my power charge and provided with either lock-washers and nuts or nail type nylon anchors are not acceptable in lieu of machine screws. Wood plugs must not be used as expansion shields. Unless conditions or Drawings dictate otherwise, panels must be located between 3'-6" and 6'-0" above floor level.

3.7 SLEEVES INSTALLATION FOR SECURITY SYSTEMS

A. 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.

B. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

C. 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.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors 50 mm above finished floor level.

F. Size pipe sleeves to provide 6.4-mm annular clear space between sleeve and pathway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements of Section 07 92 00 "Joint Sealants."

I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Section 07 84 13 “Penetration Firestopping”

J. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 25-mm annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 25-mm annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.8 FIRESTOPPING

A. Apply firestopping to all penetrations of fire-rated floor and wall assemblies for electronic safety and security installations to restore original fire-resistance rating of assembly.

3.9 CABLE/WIRES INSTALLATION

A. Cable/wire runs and conduit must be installed in accordance with manufacturers' specifications of installed equipment.

B. All ESS conductors must be separated from 240V primary power lines. ESS conductors must not share any conduit in which primary power conductors are run. Junction and receptacle boxes carrying 240V, or higher voltage, must not in any way be attached to or carry security systems conductors.

C. Conductors must be copper and must not have a diameter less than eighteen (18) AWG unless otherwise indicated. Exceptions will be made for vendor-provided leads and internal equipment wiring. If required,

modify equipment wiring fittings which will not accept eighteen (18) AWG minimum conductors. Conductors for intercom systems and for multiplexer data communications must be a minimum of twenty-two (22) AWG. Other exceptions may be granted for use of smaller gauge conductors upon approval by the Commissioner.

D. Conductors interconnected to equipment subject to movement must be stranded or must be of a type manufactured specifically for such interconnections.

E. Wire fill, conductors, and conduit fill must be maximum 40%.

F. In the event that ESS conductors must share conduit with other low voltage conductors, prior approval is required. All system conductors must be run concealed wherever practical, and must be placed in conduit.

G. All conductors must be run continuously between sensors, processors, junction boxes, terminal strips or panels, and other approved devices. Splices between such locations are not to be permitted. Necessary junctions must be made using screw-type terminal blocks, or in accordance with manufacturer's requirements for equipment connections.

H. Line supervision requirements must be observed

I. All conductors must be color coded and tagged consistently. Coordination with the Commissioner regarding the exact wire coding and tagging is mandatory. Transposing or changing color coding of conductors must not be permitted. Conductor identification must be provided within each enclosure where a tap, splice or termination is made, and at the equipment terminal of each conductor. Terminal and conductor identification must match that shown on approved shop drawings. Hand lettering or marking will not be accepted. Marking must be an approved permanent type utilizing an approved method. Tagging devices must be approved and must be permanent, not subject to inadvertent separation. All conductors at control consoles must be bundled, neatly fanned out, and tagged. Cables and wires must be tagged to clearly indicate their electrical characteristics, circuit number and panel designation. Tagging must be such that several conductors may be disconnected and reconnected without the use of drawings.

J. If required by manufacturers' specifications, shielding requirements must be observed.

K. Only approved pulling compounds must be used. Pull strengths must not exceed manufacturer recommendations.

L. Submit conduit and wire layout drawings showing circuit numbers, wiring and conduit routings for approval by the Commissioner prior to the initiation of Work. Shop drawings of the security systems conduit routing must be coordinated with fire wall construction, mechanical duct work, structural components, fire protection, and plumbing.

3.10 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.11 IDENTIFICATION FOR SECURITY SYSTEMS

A. Identify ALL system components, wiring, and cabling complying with TIA/EIA-606-A. For fire-resistant plywood, do not paint over manufacturer's label.

B. See evaluations for discussion of TIA/EIA standard as it applies to this Section. Paint and label colors for equipment identification must comply with TIA/EIA-606-A for Class 3 level of administration including optional identification requirements of this standard.

C. All permanent labels must be durable and legible and suited for long term use in the environments in which they will be located. Labels must be preprinted or computer-printed type. Handwritten labels are unacceptable unless approved by the Commissioner.

D. Label all equipment, enclosures, cables, terminations and any other components using unique identifiers.

E. Labeling scheme for all communications systems is subject to prior approval by the Commissioner.

3.12 CLEAN, SQUARE INSTALLATION

A. All equipment must be clean and free of paint and other defacing materials. All installations must be square and plumb. Take care that other trades do not deface equipment and do not move equipment out of square and plumb.

3.13 ELECTRICAL POWER

A. High Voltage Power:

1. Furnish and install wiring, conductors, conduit, and termination for the supply of power to security system components. Except for the interconnection into the door hardware furnished devices, furnish and install all low-voltage conductors and to make all final connections of same. Provide the electrical subcontractor with complete information regarding high voltage power requirements.

B. Low Voltage Power:

1. Low voltage power must be provided through the use of two-winding isolation-type transformers and rectifier circuits and must supply DC voltages, where and as required. Voltage levels must be as rated for the various systems' operational requirements. All low voltage power supplies must be fully regulated, float type, with battery back-up, capable of supporting the operation of all equipment for a minimum of four hours. Low voltage power supplies must be required to provide central lock power, camera power, advanced processor controller power and sensor devices power.

C. Batteries:

1. Provide backup power by dedicated batteries in remotely located system elements such as remote access control panel units. Batteries must be sized to provide continuous stand-by operation for a minimum of four (4) hours without recharge or replacement.

3.14 TESTING

A. General: Verify that all requirements of this specification are met. Verification must be through a combination of analyses, inspections, demonstrations and tests, as described below.

B. Verification by Inspection: Verification by inspection includes examination of an item and the comparison of pertinent characteristics against the qualitative or quantitative standard set forth in the cited paragraph. Inspection may require moving or partially disassembling the item to accomplish the verification. Inspection must be made of all equipment installations, proper functioning of all locking hardware and lock controls, mounting and wiring of electrical and signal distribution cabinets and components, and mounting and placement of sensors, VSS cameras, etc. to ensure compliance to the specifications and that the overall

installation is accomplished in a professional and workmanlike manner. The Commissioner must have full opportunity to witness the required inspections or to conduct own inspections of the installation.

C. Verification by Test and Demonstration: Verify by formal demonstrations or tests that the requirements of this Specification have been met.

D. Test Verification Requirements: Paragraphs 1-3 below list specific requirements which must be verified by formal demonstration/test. The Commissioner must be afforded a fourteen (14) day advance notice of all subsystem demonstrations/tests. The Commissioner reserve the right to witness any and/or all of the tests described below.

1. Preliminary Tests: Following installation, individually test each sensor and other components and verify the proper functioning of each component within a particular subsystem. Each subsystem must be similarly tested until all detection zones, alarm assessment components, alarm reporting and display, and access control functions have been verified. Any deficiency pertaining to these requirements must be corrected prior to final functional and operational tests of the system. When subsystem verification is complete, the entire system must be tested to assure that all elements are compatible and function properly as a complete system.

2. System Operation Test: Following completion of the preliminary tests and the security system and component formal demonstrations conduct a formal test, to be known as the "System Operation Test", in which all components and subsystems of the security system are demonstrated to operate together as an integrated system. This test must be performed over a continuous seventy-two (72) hour period. A testing plan and test procedures for each portion of the test must be prepared by the security sub-contractor and submitted prior to the start of any testing. Approval of the test procedures must be obtained prior to notification of testing to the Commissioner. Demonstrate that the security system components and subsystems meet specification requirements in the "as-installed" operating environment during the "System Operation Test". While no formal environmental testing is required, measure and record temperature, humidity, and other environmental parameters, and must include this data in the test report to document the environmental parameters and the environment conditions which were encountered during the "System Operation Test".

3. Tests Upon Completion of Work: Upon completion of the Work, the system must be subjected to complete functional and operational tests. When all required corrections have been accomplished, the system must be re-tested. The Commissioner must be notified in writing fourteen days in advance of the proposed final acceptance testing and inspection date. The advance notice must include certification that the installation is complete and operable and has satisfactorily performed the final tests specified herein. The acceptance testing and final inspection will be accomplished in the company of the Commissioner. Prior to the test date, prepare and submit for approval a complete and detailed final acceptance test check off list ("punch list"). The list must be a complete representation of all specified functions and conditions, including contingency, priority, and abnormal modes of operation. The arrangement of the list must be such as to provide an orderly method of tabulating checks of system features, response and operation. The tests must be structured so that all sensors and controls are stimulated directly in their installed and finally adjusted positions and all audible and visual displays, signals, alarms and other responses are observed and printed. At the time of final acceptance testing all required tests must be repeated and all defects will be corrected until the system is found to be acceptable to the Commissioner. A log of all test activities and results must be maintained by the security subcontractor. Typed copies of this log must be submitted within seven days of the testing. Final tests must include the following:

   a. Test of all central CPU's, peripherals, and all panel control functions.

b. Test all graphic control and annunciation panel functions and displays.
c. Test electrical supervision of all input/output sensor and data communication bus circuits.
d. Test of all alarm initiating devices.
e. Test of remote battery and battery chargers.
f. Test of the UPS system including a battery discharge test
g. Test of access control system to include tie-in to fire alarm system.
h. Complete operation tests under emergency power.
i. Test of fiber optics signal transmission system.
j. Visual inspection of all wiring.
k. Verification that all required submittals have been provided and have been accepted.
l. Demonstrate software and programming/reprogramming functions of all micro-processor systems.
m. Verification of systems response time.
n. Carefully plan and coordinate the final acceptance tests so that all tests can be satisfactorily completed during one continuous testing period. Provide all necessary instruments, labor and materials required for tests, the equipment manufacturer's technical representative, and qualified technicians in sufficient numbers to perform the tests within the time limits imposed by this Specification.
o. Although successful completion of the final acceptance test has been completed, the security system must not be considered accepted until it is determined that the complete security system is continuously trouble-free and operational, in a manner satisfactory to the Commissioner, for at least a seven-day period following final acceptance testing. A print-out of the system's activity log will be accepted as proof of compliance with this requirement. In the event that the system fails this operational test, make the necessary adjustments and the seven-day period will restart from the beginning. If the system fails to complete this operational test for four (4) consecutive seven-day restarted test periods, the system must be considered inoperable and unacceptable. Make all necessary repairs, adjustments, and/or replacements, at no cost to the City of New York. When all adjustments have been completed and after proper notice has been given, the complete acceptance test will be re-performed and witnessed from the beginning.

4. Reliability/Maintainability Data: Record hours of component, sub-system and system operation, together with failure and repair data. This information must be incorporated into the System Test Report to be submitted.

3.15 OPERATING INSTRUCTIONS

A. Prior to substantial completion, provide field operating instructions with respect to operation functions and maintenance procedures for the equipment and systems installed. Prepare six (6) copies of operating instruction manuals. Organize operating data into suitable sets of manageable size.

B. All equipment provided under this Section of the Specifications must be placed in operation and must function continuously in an operation test for a period of one week, without shut down due to mechanical failure.

C. Provide operating, service, maintenance instruction manuals containing replacement data for the equipment which will require operating, maintenance or replacement and one copy of this literature must be available during the instruction of the operating personnel while the others are checked for completeness.

D. Sufficient advance notice must be given to the Commissioner for the specific instruction period. Upon completion of instruction, obtain written verification that the instruction has been performed. Such verification must be forwarded to Commissioner.

E. Each copy of the approved operating and maintenance manual must contain copies of approved shop drawings, equipment literature, cuts, bulletins performance charts, pump curves, details, equipment and data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed and bound in a hard back three ring binder. Fly sheets must be placed before instructions covering each section. The instruction sheets must be in 8 1/2 inches by 11 inches with large sheets of drawings folded in neatly. Each manual must have the following minimum contents:

1. Table of Contents

2. Maintenance

    a. Maintenance and Lubricating Instructions
    b. Replacement Charts
    c. Preventive Maintenance Recommendations
    d. Trouble-shooting Charts for Equipment Components
    e. Testing Instructions for each Typical Component
    f. System Draining and Filling Instructions
    g. Two typed sets of charts indicating equipment tag number, location of equipment, specific equipment service, greasing and lubricating requirements as recommended, lubricant type and intervals of lubrication.
    h. Two types sets of instructions for ordering spare parts. Each set must include name, telephone number and address of where they may be obtained.

3. Manufacturer's Literature

    a. The equipment for which shop drawings have been submitted and approved.
    b. Wiring Diagrams
    c. Installation Drawings
    d. Manufacturer's Representative and Contract Information
    e. Guarantees

3.16 CLEANING AND ADJUSTING

A. Subsequent to installation, clean each system component of dust, dirt, grease or oil incurred or accrued from other project activities, and prepare for system activation by manufacturer's recommended procedures for adjustment, alignment or synchronization.

B. Each component must be prepared in accordance with the appropriate provisions of the component's installation and operations manuals.

3.17 SPECIAL TOOLS

A. Provide any and all special tools, recommended by the manufacturer of items furnished, noted as not being commonly available.

3.18 INSTRUCTION

A. Engage instructors that are properly trained by manufacturer to instruct the operating personnel to adjust, operate, and maintain security access systems.

B. Provide technical services and materials required to instruct operators, maintenance persons, and programmers/database set-up personnel to operate, maintain and program the system.

END OF SECTION 28 05 00

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SECTION 28 10 00 - ACCESS CONTROL

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. Access Control System (ACS)
    a. Software
    b. Server
    c. Control Panels
    d. Credential Readers
    e. Field Devices
    f. Cabling and Power Supplies
2. Coordination with:
    a. Door Hardware
    b. Fire Alarm
    c. Telecommunications
    d. Electrical
    e. Other Trades

B. This section describes the components that comprise the Access Control System and practices to be used when installing them.

C. The system includes all hardware and software, communications devices, panels, reader electronics circuit boards, I/O boards, card readers, request-to-exit devices, intrusion detection sensors, duress switches, power supplies, and any conduit, wiring, conductors, raceways, termination cabinet enclosures, mounting hardware, and all other devices required for a complete and fully functional system, whether specified herein or not.

D. Related Sections

1. Section 08 71 00 “Door Hardware”
2. Section 26 05 26 “Grounding and Bonding for Electrical Systems”
3. Section 26 05 29 “Hangers and Supports for Electrical Systems”
4. Section 26 05 33 “Raceways and Boxes for Electrical Systems”
5. Section 28 05 00 “Common Work Results for Electronic Safety and Security”
6. Section 28 20 00 “Video Surveillance”

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. List of submittals:
   1. Refer to Section 28 05 00 “Common Work Results for Safety and Security”.

1.5 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kantech EntraPass or comparable product by one of the following:
   1. Lenel/S2 NetBox
   2. Avigilon Access Control Manager
   3. Or approved equal.

2.2 SYSTEMS DESCRIPTION

A. The Access Control System (ACS) must provide an integrated/unified access control and video surveillance solution.

B. The ACS must include a server with applications software, communication between the server and controllers, operator and administrator workstations with appropriate software, hard copy printers and secure backup media.

C. The server must be rack mounted and must be located in the IDF/Telecommunications Room. Internal or external data storage drive for the video surveillance cameras must be provided.

D. The equipment rack for the server will be provided as part of the Structured Cabling System (Division 27).

E. The access control security field devices (readers, door position switches, REX, etc.) must communicate with the field panels via a dedicated cable network. The field panels must communicate to the server via a Fast Ethernet 10/100 TCP/IP network, or RS-232/RS-485 connection.

F. The ACS must utilize dedicated cabling for communication between controller panels (ACP) and the security devices. The ACPs must be located in the IDF/Telecommunication Room and must have on-board storage that will allow them to operate on a continuous basis even if there is a network failure. Access control decisions may be made locally at the access control panel. Upon the network being restored, the stored alarms on the control panel could then be transmitted to the server for storage and reporting.

G. Coordinate the installation with all other trades.

H. The ACS must utilize structured cabling system for communication between the control panels and the server/workstations.

I. The network switch must be PoE complaint and provide IEEE 802.11af power to the fixed cameras. The network switch will be provided by the Commissioner.

J. Provide complete initialization of the systems' hardware and software. Coordinate with the Commissioner to determine requirements prior to initialization. Transfer and/or enter all data into the CPU databases, including complete hardware and software configuration, alarm point database, time zone database, employee cardholder database, reports configuration, device database, I/O database, and any other required set-up.

K. Coordinate the requirements of this Section with all other trades.

2.3 FUNCTIONAL REQUIREMENTS

A. The ACS must manage the entrance and exit of people through secure areas. In addition to the access control the system must monitor specific alarm points.

B. To control operational security portals, provide card readers, shunt switches, electronic locking elements, request-to-exit sensors, multiplexer panels, power supplies, intrusion detection sensors, audible/visual alarm devices, and central processing and control equipment as described herein and on the contract drawings.

C. The system must provide the following main functionality:

1. Access Control

   a. User interface secured access under encrypted password control.
   b. Anti-passback function.
   c. Multiple access levels per person.
   d. 128-bit card support for Wiegand card readers.
   e. Detailed time specifications.
   f. Simultaneous support for multiple card data formats.
   g. Scheduled portal unlock by time and threat level.
   h. Compatibility with various input devices, including keypads.
   i. Activation/expiration date/time by person.
   j. Multiple holiday schedules.
   k. Timed unlock schedules.
   l. Scheduled actions for arming inputs, activating outputs, and locking and unlocking portals.
   m. Card enrollment reader support.
   n. Integration with supported alarm panels.

2. Alarm Monitoring

   a. Common alarm panel integration for disarm on access, and arm on egress.
   b. Integrated alarm monitoring and event management with alarm panels.
   c. Support for the direct viewing of IP cameras.
   d. Provides alarms on video loss, video motion detection, and video restore events.
   e. Provides alarms on communication loss.
   f. Provides the ability to record video and link to video for alarm events.
   g. Available video control and playback through the user interface.
   h. Build and maintain monitored (alarm) point tables, authorized user tables and other system databases.
   i. Detect alarm, tamper and trouble conditions at all monitored points.
   j. Collect and process information from all monitored points.
   k. Regulate access of personnel and maintain accountability.
   l. Annunciate all alarm, tamper, duress and trouble conditions, advisories, executed keyboard control functions and keyboard control functions input errors.

m. Annunciation of duress and defibrillator alarms must be different and identifiable. Local visual and audio annunciation must also be provided for these alarms.
n. Maintain a time-stamped log of all alarm, tamper and trouble conditions, advisories, executed keyboard functions and keyboard control function input errors.
o. Display and/or print system status information on demand.
p. Store all alarm, tamper and trouble conditions, advisories, executed keyboard control functions and function input errors, test results and access control information.
q. Dump/reload historical records, system programs and database information.
r. Display and or print historical logs on demand.

3. Integration with the Video Management

2.4 SYSTEM PARAMETERS

A. Provide all required system components and accessories for the devices shown on drawings. In addition, the system must be scalable to allow addition of future devices. Provide 5% spare capacity.

B. System Parameters

1. 32 IP Cameras at 4CIF
2. 32 Card readers and/or keypads
3. 2 Workstations
4. 2 Concurrent Web/Mobile connections
5. 10,000 Access cards

2.5 SYSTEM SOFTWARE

A. Must support system partitioning.

B. The system software must be capable to support the maximum system capacity as listed above, input points, intrusion detection points, and relay outputs. The database server must support up to 5,000 cardholders, visitors, and assets limited only by the available memory on the ISC. The database server must also support an unlimited number of system events and System Operator transactions in the history file. Client Workstations must be limited only by the limitations of the operating system server software.

C. Software Functionality

1. Time Zones
   a. Must be capable of creating and storing up to two hundred fifty-five (255) time zones. Each time zone must have a minimum of six (6) intervals. Each interval must be assignable to any day of the week and capable of being restricted on a minimum of eight (8) types of holidays.
   b. Each time zone must be assignable to an alphanumeric name of up to 64 characters. Time zones must be applied to access levels, card reader modes, alarm inputs, alarm outputs, and alarm masking and logging functions. Time zones must be allowed to belong to any or all access levels so that the time zone only has to be defined once.

2. Access Levels
   a. Must be capable of defining multiple access levels with a minimum of 32 access levels per cardholder per segment. Each Access Level must be assignable to an alphanumeric name using up to 64 characters.

b. Card readers must have the ability to be assigned to any or all access levels defined in the system. Individual card readers must be capable of having a distinct time zone assigned to it.

3. Temporary Access Levels
   a. Must be capable of assigning Temporary Access Levels.
   b. Each Temporary Access Level must be definable with a start and end date.

4. Access Groups
   a. Capable of assigning Access Groups with a maximum of 32 Access Levels per Access Group.
   b. Each Access Group must be assignable to an alphanumeric name using up to 64 characters.
   c. Holidays
   d. Provide a minimum of 255 Holiday assignments
   e. Dates for Daylight Savings Time changes must be definable and must take effect automatically.

5. First Card Unlock
   a. Provide a First Card Unlock feature that when configured retards a pre-determined time zone activated unlock command until a valid credential has been presented and granted access to the portal

6. Field Hardware Communications
   a. Communicate with the ISCs by the following protocols: RS-232, RS-485, TCP/IP, Dial-up via Modem
   b. Download communication between the system and the ISC must be fully multi-tasking and must not interfere with operational functions.
   c. Upon loss of communications between the server and the ISC an alarm must be created with a time stamp. Upon re-established communication the system and the ISC must automatically re-synchronize from the point of communication loss without operator intervention.

7. Multi-Drop Panel Support
   a. Support a multi-drop Intelligent System Controller architecture.
   b. The multi-drop panel support must be used in conjunction with other ISC wiring support such as the star wiring configuration, home-run wire architecture, and advanced distributed network architecture.

8. Alarm Masking Groups
   a. Support a group alarm masking feature whereas System Administrators must be able to create groups of alarm inputs that enable them to mask or unmask multiple Input Control Module inputs and card reader inputs simultaneously.
   b. The following events must have the ability to be part of an alarm masking group: Input Control Module Events, Alarm Input Active, Card Reader Events, Auxiliary Input Active, Denied Count Exceeded, Door Contact Tamper, Door Forced Open, Door Held Open, Card Reader Input Tamper
   c. Alarm Masking Groups must be able to be masked as a group or as individual points.

9. Alarm/Event Logging
   a. All alarms and events in the system must by default, always be recorded in the database. The system must give System Administrators the ability to select on a time zone basis, the times that they require the ACAMS to log specific events to the database.
   b. System Administrators must have the option for Alarm/Events to be set to log or not to log particular alarms/events on any individual reader and or input.

10. Scheduling Utility
    a. Must provide an integral Scheduling Utility.

11. Multiple Card Formats
    a. Support an unlimited number of card formats.
    b. Support any magnetic stripe format that uses card number, facility code, and issue code combinations with a maximum of a nine digit card number and two digit issue code. Support any industry standard Wiegand card format.
    c. Card Reader Time Zone Overrides
    d. Allow for the pre-defined default card reader settings to be overridden or temporarily changed on a time zone basis.

12. Alarm/Event Routing
    a. Capable of allowing System Administrators to route alarms and events to various Alarm Monitoring client workstations on the network. Allow any alarm or event to be routed to one or multiple client workstations on the network regardless of where the alarm is generated in the field. Alarms must be routed to client workstations on a device by device level.
    b. Implement network synchronization that in the event alarm/event is routed to multiple client workstations, once the first client workstation 'grabs' the alarm, the alarm/event must be cleared from all other client workstations. As such, alarms that are routed to an Alarm Monitoring client workstation which does not have a System Operator logged in must be queued so that all unacknowledged alarms will report to that client workstation once a System Operator has logged into the system. Alarms/Events must be routed based on default settings or time zone control.

13. Reporting
    a. The software must include templates for various types of reports to include the following:
    b. Card use reports
    c. Manual operations reports
    d. Alarm reports
    e. Historical reports
    f. Time & Attendance reports
    g. Detailed reports
    h. Summary reports
    i. Statistical reports
    j. Roll Call Reports
    k. The system software must allow for the creation of custom reports based on any event or component in the system. It must support an unlimited amount of customized reports.
    l. All reports must be able to be displayed on screen, printed, or sent by e-mail on a daily, weekly, or monthly basis. All event reports can be automated to be generated and sent at a specific time for a specific time period.

D. Basis of Design Product: Subject to compliance with requirements, provide Kantech EntraPass Corporate Edition Security Management Software or comparable product by one of the following:

1. Lenel/S2 NetBox.
2. Avigilon Access Control Manager Pro
3. Or approved equal

2.6 SERVER

A. Basis of Design Product: Subject to compliance with requirements, provide Kantech INTEVO Corporate Edition INTEVO-CMP-2TB or comparable product by one of the following:

1. Lenel/S2
2. Avigilon
3. Or approved equal

B. Workstations

1. The Client Workstation(s) will be shared computers furnished by other trades.
2. Provide, install and configure client software for two workstations.

C. Access Control Panel (ACP)

1. The access control panel (ACP) must be a self-contained, microprocessor-controlled field panel. The panel must serve as the data collection and communications interface between the Host and the various field devices such as card readers, alarm inputs and control outputs. The ACP must operate as an elevator control device. The panel must operate in host controlled, local decision or dial-up mode. Configuration information (i.e. card records, time commands, door/monitor point/control point configuration, etc.) must be downloaded from the host computer. Local programming at the ACP or the use of EPROMs is not required.
2. The ACP must be able to communicate back with the database server through industry standard switches and routers and must not have to be on the same subnet.
3. The ACP is required to continue to function normally (stand-alone) in the event that it loses communication with the system software. While in this off-line state, the ACP is required to make access granted/denied decisions and maintain a log of the events that have occurred. Events must be stored in local memory, and then uploaded automatically to the system database after communication has been restored.
4. Provide all components listed below.
    a. Enclosure
        1) The ACP must be housed in a locking cabinet, suitable for wall mounting. All cabinet locks must be keyed alike. The cabinet must be equipped with a tamper switch on the front door and on the back of the unit. Tamper alarms must automatically report to the host computer when activated. The cabinet must be suitably sized to allow installation of the panel, all expansion modules and associated field wiring. The cabinet door must include illuminated diagnostic indicators, which must indicate the status of the panel.
        2) The ACP must be expandable in a modular fashion, requiring only those modules necessary for the application. Where possible the expansion must be accomplished via field installed modular components. The supported modular components must include card reader modules, reader communication wiring modules, alarm input and relay control modules.
        3) The ACP must operate on 12 VDC, via a regulated power supply, installed in the ACP cabinet, or via an external battery backup unit operating up to a maximum of 13.8 VDC. The ACP must provide necessary power to all card readers and expansion modules.
        4) Field wiring must be connected to the ACP through the use of screw clamp type connectors, which can be removed from the ACP. These connectors must allow the replacement of modules without requiring the disconnection of field wiring. The contact pins on the ACP must be spaced in such a manner as to prevent cross wiring of neighboring connections.
        5) The Class A supervised alarm inputs must utilize end-of-line resistors, providing four (4) states of the alarm circuit (normal, alarm, open circuit, shorted circuit). The same end-of-

line resistor values must be used by all supervised alarm inputs connected to the ACP or any expansion module. The relay contacts on the ACP and all auxiliary modules must be rated 5A@30 VDC.

6) The ACP must operate in a temperature range of 0°-70° C. Temperature range for use with battery backup must be 0° - 50°C.

b. Controllers

1) The Controller must link the ACS Software to all "down-stream" field hardware components. The controller must provide full distributed processing of access control alarm monitoring rules and operations. A fully loaded and configured controller must respond in less than one-half second to grant or deny access to cardholder.
2) The controller must be an Ethernet-ready four door controller with sixteen monitored points, or two-door controllers with eight monitored points on-board door strike power, sixteen reader outputs, four relay outputs, and auxiliary power output.
3) Provide all required reader boards, input/out, enclosures and power supplies and any components and accessories required for a functional system.
4) Provide associated enclosures, power supplies, batteries, expansion modules, and any required accessories and mounting hardware.
5) Basis of Design Product: Subject to compliance with requirements, provide Kantech KT-400, or comparable product by one of the following:
   a) Lenel/S2
   b) Avigilon
   c) Or approved equal

D. Credential Readers

1. Must be contactless proximity readers type with a wall switch reader assembly consisting of a reader antenna which may be mounted directly on any standard metal or plastic single gang electrical box or on a flat wall, and a remote electronics module (all readers must be flush mounted, where applicable, with the gang box recessed within the wall). The unitized reader with read antenna and necessary electronics for transmission of the card code to the system all contained in a single package.
2. The reader must operate within the temperature range of minus 30 degrees to plus 65 degrees centigrade with relative humidity of 95 percent non-condensing. Reader must be designed to operate on low voltage AC or DC. An alarm signal must be provided to indicate failure of any portion of this internal power supply equipment.
3. Power for the reader module must be supplied by the access control. All data and power wiring must be in accordance with manufacturer specification.
4. A standard reader housing must be available. The Commissioner must determine manufacturer standard color. The reader housing must be secured to the mounting plate with tamper resistant screws.
5. Provide wall, surface or mullion mounted, as required.
6. Card readers should be contactless readers compatible with the Commissioner existing access cards and must match the readers installed in the exiting building. Coordinate with Commissioner before ordering.

7. Basis of Design Product: Subject to compliance with requirements, provide HID Signo 40K, or comparable product by one of the following:

   a. Lenel/S2
   b. ASSA ABLOY
   c. Or approved equal

E. Request-to-Exit Motion Sensor

1. Provide passive infrared technology request-to-exit (REX) motion detectors, for the existing doors, as required.
2. All devices must be specifically designed for request to exit applications. Devices specifically designed for other security related applications are unacceptable.
3. All REX devices must be interconnected such that they provide a direct input into the associated network controller. Designs where REX devices are directly interconnected with door monitoring switches are unacceptable.
4. REX devices installed at doors with electro-magnetic locks must also be interconnected such that the second relay contact in the REX device is wired to interrupt power to the associated electro-magnetic lock whenever the REX device senses motion at the door.
5. Must have adjustable beam to ensure that the coverage does not extend to the unsecure side of door and it is not triggered by people passing by.
6. Finishes and mounting details at each door location must be coordinated with and approved by Commissioner.
7. Basis of Design Product: Subject to compliance with requirements, provide Bosch DS160, or comparable product by one of the following:

   a. Honeywell
   b. DSC
   c. Or approved equal

F. Request-to-Exit Push-Buttons

1. Request-to-exit push-buttons must be located at locations shown on contract drawings.
2. All REX devices must be interconnected such that they provide a direct input into the associated network controller. Designs where REX devices are directly interconnected with door monitoring switches are unacceptable. Each push-button provided must include an adjustable pneumatic timer. The timer must allow the door unlock time to be adjustable from 2 to 60 seconds. (Initial set point must be 30 seconds).
3. Finishes and mounting details at each door location must be coordinated with and approved Commissioner.
4. Basis of Design Product: Subject to compliance with requirements, provide Dortronics Systems W5286-P23DAXE1, or comparable product by one of the following:

   a. Honeywell
   b. Interlogix
   c. Or approved equal

G. Door monitoring contact

1. The contact contains a hermetically sealed magnetic reed switch. Switches must be reed switches, epoxied and/or potted in the switch housing. Magnets must be permanent Alnico type, finish to match door jam. Rare Earth Magnet must be made of neodymium iron boron.
2. Contact must be rated at 30 VDC (50 mA) for 1,000,000 cycles, minimum.
3. Housings must be molded of flame retardant ABS plastic. Magnetic contact switches must be protected to deter sticking or freezing
4. The gap distance for wood must be 1" and steel up to ½".
5. The unit must have a 1" diameter, with open or closed loop operation with an electrical configuration of double pole-double throw (DPDT).
6. Provide recessed contacts for all new doors and surface mount for the existing stairway doors.
7. Basis of Design Product: Subject to compliance with requirements, provide Honeywell Ademco 7939WGXE1, or comparable product by one of the following:
   a. George Risk Industries
   b. Interlogix
   c. Or approved equal

2.7 ENCLOSURES FOR ESS

A. Refer to Division 28 Section "Common Work Results for Electronic Safety and Security".

B. Coordinate with the Commissioner for ESS equipment installation in the Hub Room.

C. ACS Panels and Locks Power Supplies

1. The access control and lock power supply must be UL Listed Fire and Access Control Power Supply (UL1481, UL294). It must be Class 2 rated and NFPA 72 compliant.
2. The lock power supply must have a 240V, 50Hz input, 6 amps continuous supply current and be field selectable 12VDC or 24VDC. The unit must contain five individual power limited outputs. The unit must have sufficient batteries as to operate either magnetic locks or electrified strikes for at least four (4) hours from the time of power failure to the lock power supply.
3. The lock power supply must provide a dry contact interface to the fire alarm system. The intent of the interface is to disconnect the primary power to the supply when a fire alarm signal is sent from the fire system to automatically unlock electrified locked fail-safe doors.
4. The control panels and all devices connected must be fully operational via a battery backup system. The backup system must provide for four (4) hours of continuous operation without degradation of the system. The host must be notified if the system goes to battery back-up.
5. The power supply for the control panel must be dedicated only for the device. Provide, at each control controller location, a lock power supply. The power supply must provide power for each connected lock and request to exit motion detector, where applicable. The lock power supply must be separate from the power supplies used to power the associated control panel.
6. Provide a power supply fuse with each supply such that the primary side of the supply is properly fused. In addition, provide secondary power supply fuses for each connected lock.
7. Each supply must be sized such that its continuous power output rating is 200 percent of the connected load or a minimum of 100 VA whichever is greater.

8. All power supplies must be configured for direct hardwired connection to a 120 VAC circuit. Power supplies or power supply transformers provided with electrical plugs or transformers designed for receptacle mounting are unacceptable.
9. All lock and request to exit detector power supplies must be provided with battery backup, as Specified.
10. Basis of Design Product: Subject to compliance with requirements, provide Altronix AL600ULACM, or comparable product by one of the following:
    a. Life Safety Power
    b. ASSA ABLOY
    c. Or approved equal

2.8 CABLES

A. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

2.9 GROUNDING

A. Comply with requirements Section 26 05 26 “Grounding and Bonding for Electrical Systems”.

B. Insulators must electrically isolate bus bars from the wall, or other mounting surfaces, thereby controlling the current path.

C. Provide required stainless-steel hardware to fasten the two-hole ground lugs to the bus bar.

2.10 LABELING

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION PRACTICES

A. All materials must be installed as per the manufacturers’ instructions, unless noted otherwise.

B. Comply with NECA 1.

C. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

D. Comply with NECA 1, "Good Workmanship in Electrical Contracting."

E. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

F. All equipment must be installed according to manufacturers’ instructions.

3.3 EQUIPMENT INSTALLATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Examine roughing-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."

E. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval.

F. Record setup data for control station and workstations.

G. For each Location, record setup of Controller features and access requirements.

H. Propose start and stop times for time zones and holidays and match up access levels for doors.

I. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.

J. Assign action message names and compose messages.

K. Set up alarms. Establish interlocks between alarms, intruder detection, and video surveillance features.

L. Prepare and install alarm graphic maps.

M. Develop user-defined fields.

N. Develop screen layout formats.

O. Propose setups for guard tours and key control.

P. Discuss badge layout options; design badges.

Q. Complete system diagnostics and operation verification.

R. Prepare a specific plan for system testing, startup, and demonstration.

S. Develop acceptance test concept and, on approval, develop specifics of the test.

T. Present project planning documents to Commissioner and review, adjust, and prepare final setup documents. Use final documents to set up system software.

3.4 CABLING

A. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use NRTL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

B. Install cables without damaging conductors, shield, or jacket.

C. Boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, must be provided with a lock. Boxes above ceiling level in occupied areas of the building are not accessible. Junction boxes and small device enclosures below ceiling level and easily

accessible to employees or the public must be covered with a suitable cover plate and secured with tamperproof screws.

D. Install end-of-line resistors at the field device location and not at the Controller or panel location. All wiring where exposed must be installed in conduit, minimum 3/4" or larger, in accordance with NFPA 70.

E. All cables must be terminated and connected onto termination strips. Conductors at all junction points or termination must be tagged with conductor identification.

F. Comply with EIA/TIA-569, "Commercial Building Standard for Telecommunications Pathways and Spaces."

G. Cable application requirements are minimum requirements and must be exceeded if recommended or required by manufacturer of system hardware.

H. RS-232 Cabling: Install at a maximum distance of 50 feet.

I. RS-485 Cabling: Install at a maximum distance of 4000 feet.

J. Card Readers and Keypads:

1. Install number of conductor pairs recommended by manufacturer for the functions specified.

2. Unless manufacturer recommends larger conductors, install No. 22 AWG wire if maximum distance from Controller to the reader is 250 feet, and install No. 20 AWG wire if maximum distance is 500 feet.

3. For greater distances, install "extender" or "repeater" modules recommended by manufacturer of the Controller.

4. Install minimum No. 18 AWG shielded cable to readers and keypads that draw 50 mA or more.

3.5 ELECTRICAL POWER

A. All AC power feeds to the system must be installed in conduit separate from the data bus communication and low voltage control cables. The 240 VAC input power must be furnished and installed by the electrical sub-contractor. The security subcontractor is responsible for coordinating with the electrical trade.

B. The security subcontractor must furnish and install, in accordance with the manufacturer's instructions, all interconnect wiring, and equipment necessary for the erection of a complete system as described herein and shown on the drawings. All wiring termination, except 240 VAC power inputs and above door finish hardware device inputs, is the responsibility of the security subcontractor.

3.6 SYSTEM SOFTWARE

A. Develop, install, and test software and databases for the complete and proper operation of systems involved. Assign software license to The City of New York.

B. The software must be entered into the system computer systems and debugged. Security subcontractor is responsible for documenting and entering the initial database into the system. Provide the necessary blank forms with instructions to fill in all the required data information that will make up the database. The database must then be reviewed and entered into the system by the security subcontractor. Prior to full operation, a complete demonstration of the computer real time functions must be performed. A printed validation log must be provided as proof of operation for each software application package. In addition, a point utilization report must be furnished listing each point, the associated programs utilizing that point as an input or output and the programs which that point initiates.

3.7 TESTING AND SYSTEM ACCEPTANCE

A. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

END OF SECTION 28 10 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 SUMMARY

A. Section Includes:

1. Video Surveillance System
    a. Video Management Software
    b. Video Server/Recorder
    c. Cameras
2. Video Intercommunications System
    a. Master Stations
    b. Door Stations
3. Cabling and Power Supplies
4. The following equipment will be furnished by the Commissioner:
    a. Local Area Network switches in the IDF/IT room
5. Category 6A cables for cameras and intercom provide under Division 27

B. This section describes the components that must comprise the Video Surveillance System (VSS) and practices to be used when installing them. All information herein is intended to present minimum standards of performance, quality and construction.

C. The system must include all hardware and software, closed-circuit cameras, lenses, auto-iris, controls, power supplies, mounts, housings and any conduit, wiring, conductors, raceways, termination cabinet enclosures, mounting hardware, and all other devices required for a complete and fully functional system, whether specified herein or not.

D. Related Sections

1. Section 26 05 26 “Grounding and Bonding for Electrical Systems”
2. Section 26 05 29 “Hangers and Supports for Electrical Systems”
3. Section 26 05 33 “Raceways and Boxes for Electrical Systems”
4. Section 28 05 00 “Common Work Results for Electronic Security and Safety”
5. Section 28 10 00 “Access Control”

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. List of submittals:
   1. Refer to Section 28 05 00 “Common Work Results for Safety and Security”.

1.5 QUALITY ASSURANCE:

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Video Surveillance System
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Kantech Intevo or comparable product by one of the following:
      a. Lenel/S2
      b. Avigilon
      c. Or approved equal

B. Cameras
   1. Basis-of-Design Product: Subject to compliance with requirements, provide American Dynamics Illustra or comparable product by one of the following:
      a. Lenel/S2
      b. Avigilon
      c. Or approved equal

C. Intercommunications System
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Aiphone IX-Series or comparable product by one of the following:
      a. Siedle
      b. 2N
      c. Or approved equal

2.2 SYSTEM DESCRIPTION

A. This section outlines the requirements for the Video Surveillance System (VSS) that will monitor and record images from cameras located in the new addition and will consist of a network video recorder and surveillance cameras. All information herein is intended to present minimum standards of performance, quality, and construction.

B. Provide and install a video management server, network video recorders, data storage, cameras, power supplies, and any conduit, wiring, conductors, raceways, termination cabinet enclosures, mounting hardware, and all other devices as required for a complete and fully functional system, whether specified herein or not.

C. The camera power, video and data must run over the structured cabling system (SCS). The telecommunications contractor must provide a data outlet adjacent to the VSS camera.

D. The network switch must be PoE complaint and provide IEEE 802.11af power to the fixed cameras. The network switch will be provided by the Commissioner.

E. Coordinate the installation with all other trades and must provide final termination of all conductors, except as provided by the Electrical Contractor.

F. Provide complete initialization of the Video Surveillance and Intercommunication Systems' hardware and software. Consult with Commissioner to determine requirements prior to initialization. Transfer and/or enter all data into the CPU databases and any other required set-up.

G. Coordinate the security requirements of this Section with all other trades.

2.3 FUNCTIONAL REQUIREMENTS

A. The VSS must be capable of the following functions:

1. The primary functions must be for alarm assessment, access control verification purposes and general surveillance.
2. The system must seamlessly interface with the access control system through the access control system software. Hardwired and/or direct wire solutions are not acceptable.
3. All VSS camera views must require the Commissioner's approval before final acceptance testing.
4. The VSS camera system power, video and data must run over the structured cabling. The cabling sub-contractor will provide a data outlet adjacent to the VSS camera. The cabling will run from the outlet to the IDF/IT room and terminate into a patch panel. The patch panel must be cross connected the network switch located within the respective IDF/IT Room. Coordinate with the cabling sub-contractor as to the locations required for data outlets.
5. Provide and install the patch cords required for each IP camera at the data outlet side and the IDF/ IT room side.
6. The network switch must be PoE complaint and provide IEEE 802.11af power to the fixed cameras. The network switch will be provided by the Commissioner.
7. Cameras must be IP cameras and must utilize industry standard compression algorithms to reduce the video file size for compression across the data network.
8. The IP video streams must be managed by the VSS. The video server will serve as the virtual matrix switch for the routing of video to the various monitors. In addition, the video server will provide the storage solution for the video files. The video server is existing.
9. The VSS must provide the operator to view, control and playback any VSS camera.
10. All cameras will be recorded. Designated cameras will be continuously monitored; other will be displayed upon motion detection. The system must begin real-time recording of designated pre-set alarm positions under an alarm condition. Real time recording must be 15 fps for outdoor cameras and 7 fps for indoor cameras for 2 minutes pre-alarm and 5 minutes post-alarm.

11. The video recorder NVR storage must provide storage solution for the video files. support recording all video at no less than 7 frames per second, 24 hours/7days a week at resolution of 2CIF. The digital video must be stored for a period of 30 days.
12. Remote Access via Web server using Internet Explorer
13. The VSS must provide web server service to allow authorized users to view live video, playback of recorded video and search the archive to view video using their Internet Explorer web browser.
14. Remote Access via mobile devices. The workstation functionality to include:
    a. Allow for viewing of multiple cameras simultaneously.
    b. Allow cameras recorded of different NVRs throughout the network to be displayed on the same screen.
    c. Must provide programmable camera tours.
    d. Select cameras using "drag and drop".
    e. Show multiple cameras at the same time with full synchronization between images.
15. Video Management:
    a. Alarm assessment, access control verification purposes, general surveillance and detainee processing and operations.
    b. Capable of providing pre and post alarm video.
    c. Selectively record/playback camera inputs.
    d. All views must require the Commissioner's approval before final acceptance testing.
    e. The IP video streams must be managed by the server. The systems server will serve as the virtual matrix switch for the routing of video to the various monitors. In addition, the server will provide the storage solution for the video files. Storage must support event recording at 15 frames per second for 60 days.
    f. The system must begin real-time recording of designated pre-set alarm positions under an alarm condition.

2.4 SYSTEM PARAMETERS

A. Provide all required system components and accessories for the devices shown on drawings. In addition, the system must be scalable to allow addition of future devices. Provide minimum 5% spare capacity.

B. Refer to Section 28 10 00

2.5 SYSTEM SOFTWARE

A. Provide camera licenses for the cameras installed.

B. Support JPEG, MPEG-4 and H.264 compression simultaneously.

C. Simultaneously record, playback and display live video without affecting other functions.

D. Must be capable to record and store image rates between 7 to 30 fps.

E. Must include the ability to schedule the following based on the time of day:
    1. Start recording
    2. Stop recording
    3. Cause an alarm on motion detection in camera's field of view

F. Video event detection capabilities. Must have the ability to use one, several or any non-conflicting combinations of functions on a per camera basis:

G. Automatically freeze the live video of a camera with no video event in its field of view.

H. Stop recording camera images with no video event in it field of view.

I. Start recording images up to 180 seconds before video event is detected in the cameras field of view and continue recording for up to three hundred (300) seconds after the video event stopped in the cameras field of view.

J. Per camera video event detection masking

K. Change frame rate when video event is detected

L. Must have the ability record in the following resolutions

1. 1280 x 720 pixels, normal condition recording
2. 1920 x 1080 pixels, alarm condition recording

M. Must support the simultaneous display of up to 32 video streams across all connected monitors.

N. Must provide the ability to view live and recorded video on the same camera within a single application layout.

O. Must provide a completely user-customizable 'Site View': enabling the organization of cameras, recorders, tours, salvos into user-defined, multi-level folders, similar to Windows Explorer-style file organization.

P. From any motion search result, the VMS client must allow the user to add additional, related cameras to the View and must automatically synchronize the date/time of the added cameras to the original search result ("Investigate mode").

Q. Must include an integrated Web Browser tab that can be combined with other user interface components (Video Views, Site View, Event Viewer, etc) into an Application Layout. The Web Browser tab must allow operators to continue monitoring their security system while also receiving weather or news updates from web-based information sources.

R. Must support the ability to have an Event Priority Window to display Camera Call-Up Actions associated with events in prioritization sequence based on license settings.

S. Must support a Bi-Directional interface to enable ability to easily integrate with other 3rd party systems over a serial or TCP/IP connection.

T. Must support database management tools which enable ability to setup rules to regulate the archival to provide enhanced support when using a Microsoft SQL Express database.

U. Video Storage

1. The system must begin real-time recording of designated pre-set alarm positions under an alarm condition. Real time recording must be 15 fps for 1- minute pre-alarm and 5 minutes post-alarm. For calculating storage requirements, assume 60 alarm conditions within a 30- day time frame.

V. Video Authentication:

1. The system must provide confidence the video has not been altered. Mathematical fingerprints including watermarking or 128-bit encryption must be used to verify the authenticity of the video. Altered video segments must appear blank when replayed from the original. Alteration of a single pixel must automatically cause this to occur.

2. The verification process performs the mathematical authentication algorithm to produce a fingerprint. This fingerprint is compared to the fingerprint created and stored when the video was captured on the recorder. If the two fingerprints are the same, the video is verified. If the two fingerprints are different, the video is failed. A failed video segment indicates that the video has been altered.

W. IT Requirements / Networking

1. Must operate as a read-only platform that prevents the installation of any third party software and restricts any file-level access to provide for a stronger level of virus protection and ensure a higher up-time operation in a commercial/industrial environment.
2. Must provide no file-level access to all users and administrators of the system.
3. Must integrate into standard TCP/IP network environments.
4. Must support a static IP address setting from the local IT administrator for both of the client and camera network interface cards (NICs).
5. Must utilize UDP protocol for LAN transmission of video streams, ensuring minimal latency in video display at connected clients.
6. In a WAN environment must be able to supply all audio and video streams through a single administrator defined port (default 554), simplifying routing of video through most standard firewalls and VPNs.
7. Must auto-detect whether a connected client is on a Local-Area or Wide Area Network and automatically, seamlessly switch streaming protocols.
8. In the event of a denial-of-service attack (DoS), the web server must shutdown and temporarily prevents any client access, but it must continue to manage and record video until the administrator can secure the network and restart the server.
9. The software must minimize bandwidth and eliminate video interruptions due to network packet collisions by supporting multiple networks. The client network (LAN1) must be used for outbound video transmission to client applications and two-way communication via the web client for administration and configuration. The private camera network (LAN2) must be used for transmission of video and events from supported IP cameras and encoders to the Network Video Recorder and for communication of configuration and other settings from Network Video Recorder to each individual IP camera and encoder.
10. The software must support automatic and seamless bridging of multiple networks to enable both IT and security managers to collectively integrate the server into existing networks. In this way the high bandwidth video network can be managed separately and IP video equipment isolated from core networks which may be subject to strict bandwidth and security controls. This provides for a more secure connection, bandwidth control and higher performance.

X. Basis of Design Product: Subject to compliance with requirements, provide Kantech Intevo or comparable product by one of the following:

1. Lenel/S2
2. Avigilon
3. Or approved equal

2.6 VIDEO SERVER/RECORDER (NVR)

A. Basis of Design Product: Subject to compliance with requirements, provide Kantech Intevo or comparable product by one of the following:

1. Lenel/S2
2. Avigilon
3. Or approved equal

2.7 VSS CAMERAS

A. Must be high definition (HD) min 2 MP resolution mini-dome fixed cameras with resolution and dynamic bandwidth management.

B. Must be fixed IP mini-dome color cameras, indoor and outdoor rated, vandal resistant powered by PoE.

C. Fixed cameras must have high resolution (1280x720p minimum), three codecs (H.264, MPEG-4 and JPEG), dual-streaming capability and intelligent video motion detection.

D. Low light performance at 0.3 color, and .04 lux in black and white. The low light clarity to be improved by the use of on-board IR illumination via PoE (802.3af).

E. Camera must be plenum-rated, ONVIF-compliant and provide a range of options including on-board motion detection, wide dynamic range and exposure control.

F. The camera must be suitable for both flush and surface type mounting. It must feature a local monitor output jack for on-site picture and positioning adjustments.

G. Electrical day/night function.

H. The camera's imager and lens assembly must rotate on a three-axis hinge for optimal camera positioning.

I. The camera will incorporate a network video server to encode high-quality streaming video at low bit rates for transmission over an IP network, to minimize bandwidth and storage.

J. Each IP camera must have a Real Time Clock (RTC). Network Time Protocol (NTP) support must be available to automatically synchronize the time on the device to the other components of the NTP server.

K. All IP cameras must support persistent connections to network video recorders (NVR). In the event of a temporary network or power loss the persistent connection must automatically be re-established with no manual intervention required.

L. The cameras feature automatic exposure, automatic white balance, shutter speed control, 50/60Hz selectable flicker control, programmable brightness, saturation, gamma, sharpness, windowing and decimation, simultaneous delivery of full-field view.

M. The camera incorporates necessary algorithms and circuits to detect motion in low light with clarity. The camera has IR illuminators capable of illumination up to 60 feet powered by PoE (802.3af).

N. The camera's operating ambient temperature is -40°C (-40°F) to 50ºC (122ºF) for warm start conditions (for outdoor fixed dome models).

O. The camera is FCC Part 15, Class A and CE compliant.

P. The recessed indoor camera models are UL rated as suitable for use in environmental air handling spaces, other than inside air ducts or furnace plenums, and so stated in the installation manual.

Q. Network Requirements:

1. Protocols: Telnet, RTP, HTTP, ARP, TCP, UDP, IP,ICMP, IGMPv2/v3, SNMP
2. Ethernet: 10/100 Base-T, auto-sensing, half/full duplex, RJ45
3. Overall unit delay:120 ms
4. Power over Ethernet: IEEE 802.3af compliant

R. Network Security

1. The IP dome cameras must incorporate onboard security to protect them from unauthorized access by supporting the following features:

a. All network ports not used for normal functionality will be blocked to prevent network hacking.
b. Support password protection to prevent unauthorized administration access.
c. A Firewall will be available on each Transmitter and Receiver to allow access to specified IP addresses only. SSL and other non-IP address specific security measures are deemed insufficient.

S. Administration

1. Web page administration should be available for the configuration of all parameters on the device including:

   a. Name and location
   b. IP Address
   c. Ethernet Interface speed

2. It must be possible to reset a unit back to Factory Default configuration without losing IP address information.

3. Administration must also be possible using the Console serial port.

4. Diagnostics

   a. System logging must be possible to a remote IP address, the console port or the unit itself.
   b. Dedicated web pages for diagnostic output must be available including:
   c. Current Media Connections (by IP address)
   d. Local System Log
   e. Registry Information (all settings)
   f. Boot Log (including boot up self test)
   g. System Processes
   h. Device Information
   i. Interrupt Information
   j. ASIC Information

5. Network Statistics (full network statistics including dropped packets and collisions)

6. An RS232 Transmitter console port for debug output and serial configuration must be available.

7. Telnet access for further diagnostics must be provided and restricted to administrators with the administrator password who have an IP address specified on the Firewall.

T. The Simple Network Management Protocol (SNMP) must be supported.

U. Provide cameras, as shown on drawings:

1. Elevator cameras

   a. Indoor miniature HD domes cameras.
   b. Specific camera model must be coordinated with Commissioner and elevator vendor.
   c. Provided in the elevator cars, as shown on drawings.
   d. Provide PoE+ over Coax Adapter Kit.
   e. Basis of Design Product: Subject to compliance with requirements, provide American Dynamics Illustra IPS02HFANWST2 or comparable product by one of the following:
      1) Axis
      2) Avigilon
      3) Or Approved Equal

2. Mini-dome cameras:

   a. Indoor mini-dome HD cameras with 360º panoramic views,
   b. Provide at locations as shown on drawings.
   c. Basis of Design Product: Subject to compliance with requirements, provide American Dynamics Illustra M3007PVIFS03D1ICWTT or comparable product by one of the following:
      1) Axis
      2) Avigilon
      3) Or approved equal

3. Final camera location must be coordinated in the field at the time of installation based on the field of view approved by the Commissioner.

4. Provide all required mounts and accessories.

5. Colors, finishes and specific mounting detail must be coordinated with and approved by Commissioner.

2.8 VIDEO INTERCOMMUNICATIONS SYSTEM

A. System must consist of an IP based intercommunication and all-in-one security control system featuring video entry security and two-way voice communications. The system must be capable to remotely unlock doors on a network, broadcast emergency announcements and communicate using a standard or PC master station.

B. Provide all necessary equipment required meeting the intent of these specifications, whether or not enumerated within these specifications, must be supplied and installed to provide a complete and operating video and two- way voice communications system.

C. System firmware must be the product of intercom manufacturer with sole control over revisions and/or changes. Manufacturer must provide, free of charge, product firmware/software upgrades for a period of one year from date of installation for any product feature enhancements. System firmware upgrades must not require any exchange of parts and must be capable of being executed via a laptop computer connection.

D. Master Station:

1. Must have an IP addressable desktop set with handset for voice communication with, a 3.5" LCD video monitor and a door release button.

2. Communicating selectively with other master and speaker-microphone stations by actuating selector switches.

3. Communicating simultaneously with all other stations by actuating a single all-call switch.

4. Communicating with individual stations in privacy.

5. Including other master-station connections in a multiple-station conference call.

6. Accessing separate paging speakers or groups of paging speakers by actuating selector switches.

7. Overriding any conversation by a designated master station.

8. Provide two master stations. On to be located at the reception desk, the other location to be determined.

E. Door Stations:

1. IP addressable, vandal resistant, wall mountable station with two-way voice communications and digital color camera.
2. Having privacy from remote monitoring without a warning tone signal at monitored station. Designated speaker-microphone stations have a privacy switch to prevent another station from listening and to permit incoming calls.
3. Communicating hands free.
4. Calling master station by actuating call switch.
5. Returning a busy signal to indicate that station is already in use.
6. Being free of noise and distortion during operation and when in standby mode.
7. Provide stainless steel finishes.
8. Door stations finishes/colors and specific model selection must be coordinated and approved by Commissioner.

F. Provide:

1. Basis of Design product: Subject to compliance with requirements, provide Aiphone IX-MV masters and Aiphone IX-DV door stations or comparable product by one of the following:
   a. Siedle
   b. 2N
   c. Or approved equal
2. Provide all required cables, power supplies and accessories.

2.9 ENCLOSURES FOR ESS

A. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

B. Cabinet for ESS equipment installation in the IDF/IT Room will be provided by the Commissioner.

C. Enclosure for the gate control pedestal to be coordinated with the Commissioner.

2.10 CABLES

A. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

2.11 GROUNDING

A. Refer to Section 26 05 26 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Insulators must electrically isolate bus bars from the wall, or other mounting surfaces, thereby controlling the current path.

C. Provide required stainless-steel hardware to fasten the two-hole ground lugs to the bus bar.

2.12 LABELING

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for execution requirements.

3.2 INSTALLATION PRACTICES

A. All materials must be installed as per the manufacturers' instructions, unless noted otherwise.

B. Comply with NECA 1.

C. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

D. Comply with NECA 1, "Good Workmanship in Electrical Contracting."

E. All equipment must be installed according to manufactures' instructions.

F. Refer to Section 28 05 00 "Common Work Results for Electronic Safety and Security".

G. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

H. Examine roughing-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

I. Proceed with installation only after unsatisfactory conditions have been corrected.

J. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."

K. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval.

L. Prepare a specific plan for system testing, startup, and demonstration.

M. Develop acceptance test concept and, on approval, develop specifics of the test.

3.3 CABLING

A. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use NRTL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

B. Install LAN cables using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.

C. Install cables without damaging conductors, shield, or jacket.

D. Boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, must be provided with a lock. Boxes above ceiling level in occupied areas of the building must not be considered to be accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public must be covered with a suitable cover plate and secured with tamperproof screws.

E. Install end-of-line resistors at the field device location and not at the Controller or panel location. All wiring where exposed must be installed in conduit, minimum 3/4" or larger, in accordance with NFPA 70.

F. All cables must be terminated and connected onto termination strips. Conductors at all junction points or termination must be tagged with conductor identification.

G. Comply with EIA/TIA-569, "Commercial Building Standard for Telecommunications Pathways and Spaces."

H. Cable application requirements are minimum requirements and must be exceeded if recommended or required by manufacturer of system hardware.

I. RS-232 Cabling: Install at a maximum distance of 50 feet.

J. RS-485 Cabling: Install at a maximum distance of 4000 feet.

3.4 ELECTRICAL POWER

A. All AC power feeds to the system must be installed in conduit separate from the data bus communication and low voltage control cables. The 240 VAC input power must be furnished and installed by the electrical trade. The security sub-contractor is responsible for coordinating all work with the electrical trade.

B. Furnish and install, in accordance with the manufacturer's instructions, all interconnect wiring, and equipment necessary for the erection of a complete system as described herein and shown on the drawings. All wiring termination, except 240 VAC power inputs and above door finish hardware device inputs, is the responsibility of the security sub-contractor.

3.5 SYSTEM SOFTWARE

A. Develop, install, and test software and databases for the complete and proper operation of systems involved. Assign software license to The City of New York.

B. Coordination with the Commissioner required for system configuration and programing. Use common “System’s Operational Protocol” for programming Security.

3.6 TESTING AND SYSTEM ACCEPTANCE

A. Refer to Section 28 05 00 “Common Work Results for Electronic Safety and Security”.

END OF SECTION 28 20 00

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:

1. Fire alarm and detection system

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

1.4 SUBMITTALS

A. Provide list of all types of equipment and components provided.

B. Provide manufacturer's printed product data, catalog cuts and description of any special installation procedures.

C. Provide samples of various items when requested.

D. 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.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 APPLICABLE CODES AND STANDARDS

A. All equipment must be UL listed for its intended use.

1. NFPA Standards 72-2010.
2. 2014 NYC Electrical Code

3. New York City Fire Department, Bureau of Electrical Control and 2014 New York City Building Code.

1.7 SYSTEM DESCRIPTION

A. A complete fire alarm system of the zoned, automatic and manual, coded type. 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 the following:

1. Fire Alarm Control Panel/System must be fully addressable and allow for coding of all individual pull stations, smoke detectors (code 10-2), heat detectors, duct detectors.

2. FACP/system must be capable of closed-circuit wiring for master coded systems.

3. System components must consist of the following components:

   a. Addressable manual fire alarm stations.

   b. Addressable area smoke detectors.

   c. Addresable reflective imaging beam smoke detectors

   d. Addressable heat detectors.

   e. Addressable duct smoke detectors for supply fans over 2,000cfm (air handling systems shutdown control). Provide remote LED status indicators where duct detectors are not readily accessible.

   f. Audible notification appliances; multi-tone horn (at panel), speaker/strobe combination devices.

   g. Visual notification appliances; strobes.

   h. Central station alarm connection control.

   i. Digital Alarm Communication Module

   j. Emergency battery packs.

   k. Elevator recall operation (where applicable)

   l. Relays for fans shut-down, fire shutter operation.

   m. Security system Interface Module.

1.8 CENTRAL STATION

A. The Fire Alarm Control Panel must be connected to a Central Monitoring Station through digital alarm communication module two dedicated voice lines. The provider of the monitoring service must be an approved FDNY Central Station Monitoring firm.

B. Provide necessary devices as required to allow for the FACP to communicate with the Central Monitoring Station.

1.9 WARRANTY

A. Manufacturer must guarantee the system equipment for a period of one (1) year from date of substantial completion of the system.

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. Manufacturers: Subject to compliance with requirements provide products by one of the following.

1. Edwards Systems Technology,
2. Honeywell
3. Siemens Fire Safety Solutions
4. Or approved equal.

2.2 CIRCUITING GUIDELINES

A. Each addressable loop must be circuited as shown on the drawings, but device loading is not to exceed 80% of loop capacity in order to leave for space for future devices. The loop must have Class B operation.

B. Where it is necessary to interface conventional initiating devices provide intelligent input modules to supervise Class B zone wiring.

C. For conventional zone annunciation at the control panel zones must be as shown on the zoning schedule, but will be typically as follows:

1. Manual Fire Alarm Stations: Provide one (1) alarm zone for each pull station.
2. Area Smoke Detectors: Provide one (1) alarm zone for each smoke detector.
3. Duct Smoke Detectors at HVAC Air Handling Units: Provide one (1) alarm zone for each air handling unit.
4. Provide one (1) alarm zone for each of the following special areas/equipment:
    a. Each electrical room.
    b. Each mechanical equipment room.
    c. Each elevator machine room.

D. Each of the following types of alarm notification appliances must be circuited as shown on the

drawings but will be typically as follows:

1. Audible Signals: Provide one (1) notification appliance circuit for up to fifteen (15) audible alarm devices.
2. Visual Signals: Provide one (1) notification appliance circuit for up to ten (10) strobes (15/75) candela per circuit.

E. Each of the following types of remote equipment associated with the fire alarm system must be provided with a form 'C' control relay contact as shown on the drawings, but must be typically as follows:

1. HVAC Fan Systems: Provide one (1) shutdown control relay contact for each HVAC fan system.

2.3 FIRE ALARM SYSTEM SEQUENCE OF OPERATION

A. The system must identify any off normal condition and log each condition into the system database as an event.

B. The system must automatically display on the control panel Liquid Crystal Display the first event of the highest priority by type. The priorities and types must be alarm, supervisory, trouble, and monitor.

C. The system must have a Queue operation and must not require event acknowledgment by the system operator. The system must have a labeled color coded indicator for each type of event; alarm - red, supervisory - yellow, trouble - yellow, monitor - green. When an unseen event exists for a given type, the indicator must flash. When all events of a given type have been displayed, the indicator must change from flashing to steady.

D. For each event, the display must include the current time, the total number of events, the type of event, the time the event occurred and up to a 40 character custom user description.

E. The user must be able to review each event by simply selecting scrolling keys (up-down) for each event type.

F. New alarm, supervisory, or trouble events must sound an silence-able audible signal at the control panel.

G. Operation of any alarm initiating device must automatically:

1. Update the control/display as described above.
2. Sound all audible alarm signals throughout the building
3. Turn on all strobe lights throughout the building.
4. Turn on a red alarm zone LED at the fire alarm control panel.
5. Operate the alarm relay contacts to initiate the transmission of an alarm to a central station agency via leased telephone lines.

6. Operate control relay contacts to shutdown all HVAC units serving.

7. Operate control relay contacts to shut down all supply and return dampers.

H. The entire fire alarm system wiring must be electrically supervised to automatically detect and report trouble conditions to the fire alarm control panel. Any opens, grounds or disarrangement of system wiring and shorts across alarm bell/strobe wiring must automatically:

1. Update the control/display as described above.

2. Operate the supervisory relay contacts to initiate the transmission of an alarm to a central station via dedicated telephone lines leased from approved provider.

2.4 EQUIPMENT

A. Fire Alarm Control Panel

1. The fire alarm control panel must be new.

2. New fire alarm devices must be connected to new fire alarm panel.

3. Provide new fire alarm panel that has adequate capacity for all new devices and minimum 20% "spare" for future expansion, provide additional modules as required.

4. The new fire alarm panel must be programmed.to function in accordance with 2014 NYC Fire Code and FDNY required sequence of operation.

B. Components

1. Intelligent Devices – General

a. 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. Each device must be capable of electronic addressing, either automatically or application programmed assigned, to support physical/electrical mapping and supervision by location. Setting a device's address by physical means will not be necessary.

2. Intelligent Detectors – General

a. The System Intelligent Detectors must be capable of full digital communications using both broadcast and polling protocol. Each detector must be capable of performing independent fire detection algorithms. The fire detection algorithm must

measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. Signal patterns that are not typical of fires must be eliminated by digital filters. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.

b. Each detector must have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detector head. Distributed intelligence must improve response time by decreasing the data flow between detector and loop controller. Detectors not capable of making independent alarm decisions must not be acceptable. Maximum total loop response time for detectors changing state must be 0.5 seconds.

c. Each detector must have a separate means of displaying communication and alarm status. A green LED must flash to confirm communication with the loop controller. A red LED must flash to display alarm status.

d. The detector must be capable of identifying up to 32 diagnostic codes. This information must be available for system maintenance. The diagnostic code must be stored at the detector.

e. Each smoke detector must be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information. It must be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings.

f. Each detector microprocessor must contain an environmental compensation algorithm which identifies and sets ambient "Environmental Thresholds" approximately six times an hour. The microprocessor must continually monitor the environmental impact of temperature, humidity, other contaminates as well as detector aging. The process must employ digital compensation to adapt the detector to both 24 hour long term and 4 hour short term environmental changes. The microprocessor must monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value. Differential sensing algorithms must maintain a constant differential between selected detector sensitivity and the "learned" base line sensitivity. The base line sensitivity information must be updated and permanently stored at the detector approximately once every hour.

g. The intelligent detectors must be suitable for mounting on any detector mounting base.

3. Reflective Imaging Beam Smoke Detector

a. Provide UL approved reflector- type linear optical beam smoke imaging detector - reflector (OSID-R) designed to operate as a component of fire alarm systems. The beam operates primarily on the principle of light obscuration utilizing an Infra-Red beam. The detector is a combined transmitter/receiver unit that can be directly

connected to a conventional detector circuit.

b. Optical Filtering:

1) Optical filtering, high-speed image acquisition and intelligent software algorithms provide the OSID-R system with higher levels of stability and with greater resistance to high level lighting variability. As such the detector has a better resistance to sunlight and intruding objects in its field of view compared to basic photocell receiver beam detectors.

2) Features:

a) Combined transmitter and receiver unit, range 5-100 m (16-328 ft)

b) Conventional model

c) Receiver consists of complementary metal-oxide semiconductor (CMOS) technology imaging charge coupled device (CCD)

d) Wide 12° field of view

e) Intuitive beam alignment indicated by directional arrows

f) Single IR wavelength

g) Highly resistant to building movement; tolerates +/- 1° movement

h) Resistant to strong light sources; does not alarm when saturated by sun

i) Resistant to large solid intruding objects

j) Automatic sensitivity threshold level setting

k) 50° horizontal and 20° vertical beam alignment

l) Built-in heater

m) Electronic simulated smoke test from ground level

n) Standby, fault and alarm LED indicators visible from the front and bottom

o) Automatic drift compensation

p) Paintable cover

q) Removable plug-in terminal blocks

r) Optional heater kit available for the reflector

3) Listing and Approvals

a) UL

b) ULC

c) FM

d) CSFM

4) The detector must not alarm when saturated by sunlight, reflected sunlight or any other very bright light sources. In worst case the detector will go into trouble and avoid false alarms with traditional basic photocell receiver beam detectors.

5) Internal heating must be provided on the Imager to prevent condensation on the optical surface.

6) Provide heater kit for the reflector.

7) Provide test and reset station for the detector.

a) Reset station for optical beam smoke imaging detector (OSID)

b) Red and Green LED signaling

c) Flush and surface mount solution

c. Alignment

1) The alignment of the detector must be extremely intuitive, fast and accurate. Both the IR transmitter and the complementary metal-oxide semiconductor (CMOS) imager contained in the eyeball design to turn freely in all directions. The eyeball moves +/- 20 ° in the vertical direction and 50° in the horizontal direction.

2) A laser tool can be inserted in the eyeball to allow finding the reflector quickly and then fine-tuning the eyeball to the optimum alignment.

3) Once the optimum alignment is finalized, signaled by all green arrows and LED, the eyeball is locked by tightening the lever on its side. A paintable cover is then placed over the front to hide the alignment arrows, locking mechanism and secures the locking lever in locked position.

4) The detector incorporates automatic drift compensation, whereby the detector will adjust its detection thresholds in line with any long term signal reduction of the beam caused by contamination of the optical surfaces.

4. Duct Detector Housing,

a. Provide smoke detector duct housing assemblies to facilitate mounting an intelligent photoelectric Detector along with a standard 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.

5. Intelligent Modules - General

   a. It must be possible to address each module without the use of dual in-line package or rotary switches. Devices using DIP switches for addressing are not 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 Loop Controller. Modules requiring EPROM, PROM, ROM changes or dual in-line packaged (DIP) switch and/or jumper changes are not 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. The module must be suitable for operation in the following environment:

      1) Temperature: 32ºF to 120ºF (0ºC to 49ºC)

      2) Humidity: 0-93% RH, non-condensing

6. Intelligent Manual Pull Stations

   a. Manual pull stations must be metal double action type with module to monitor each pull station. Devices using dual in-line package switches for addressing are not acceptable.

   b. Products: Subject to compliance with requirements provide one of the following:

      1) Ames model #RAM-1t-LD-NY

      2) Mircom Model MS-700

      3) Edwards Signaling F-278

      4) Or Approved Equal.

   c. Provide 5” X 8” code card holder.

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 2014 NYC Fire Code.

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 2014 NYC Electrical Code.

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. Wiring

1. Rigid conduit – THHN in accordance with 2014 New York City Electrical Code and NFPA-72, 2010.
2. EMT with Teflon – 150 C – fire alarm wiring in accordance with 2014 New York City Electrical Code and NFPA 72-2008.
3. Horn circuits 3#12
4. Strobes 2 #14
5. All other addressable loop wires #16 AWG.

G. Fire Alarm Fused Disconnect Power Supply (Fuse Cut-Out)

1. Must be installed within 10-foot distance from the service switch and connected on the line side.

3.3 FIELD QUALITY CONTROL

A. 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.

3.4 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 code enforcement official, the Commissioner and the manufacturer.

3.5 DOCUMENTATION AND INSTRUCTION

A. The contractor must compile and provide to the Commissioner three (3) complete manual on the completed system to include operating and maintenance instruction, catalog cuts of all equipment and components, as-built wiring diagrams, system program on disk (CD) 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 the facility's personnel on the operation and maintenance of the entire system. An End-User Instruction Video must be included as part of the system documentation.

END OF SECTION 28 46 00

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DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	We assume specification 012200 Expanded Work Allowance is strictly for the General Contractor. Please confirm.	Confirmed.
2	As per Volume 3, Addendum to General Conditions, Section 015000 Article 3.5.A Temporary Heat applies. Schedule E - Separation of Trades indicate that Contracts #1,2,3&4 are responsible. I assume each trade is responsible to provide temporary heat if required for their construction activities. Please confirm or clarify your requirements.	Confirmed. Schedule E of the Addendum to General Conditions, Volume E delineates the responsibilities of each separate contractor to provide (furnish and install) Temporary Heat.
3	There is a specification on Facilities Natural Gas 231123 with Contract #3. We assume the plumber is strictly responsible for all gas work including connection to all trades' equipment. Please confirm.	Gas work in NYC is in the scope of work of a licensed plumber and is part of the plumbing DOB application. Gas work will be performed under Contract #2 – Plumbing and 231123 is included in Contract No.2. Refer to updated Table of Contents and specification 231123, included with this Addendum.
4	We assume the electrician will be installing Electric Convectors and Electric Unit heaters since the Electrical trade claims this work. Please confirm.	Convectors (238233) and Wall and Ceiling Unit Heaters (238239.19) are both part of Contract #3- Mechanical and Fire Protection, but require coordination between trades. See Schedule E of the Addendum to General Conditions for reference.
5	We assume all louvers are by the GC. Please confirm.	Schedule E of the Addendum to General Conditions designates it the responsibility of Contract#1- General Contractor to provide (furnish and install) louvers (Interior and Exterior).
6	Drawings M104 and M601 call for duct smoke detectors. Please confirm this is by the Electrical/ Fire Alarm Contract No.4.	Confirmed. Smoke detectors are under Contract #4- Electrical, as per 284600 Fire Detection and Alarm.
7	Drawing SP100 is on sprinkler demo. Should it be done by the GC since all other HVAC demo is in the GC's scope? Please clarify.	Existing sprinkler demolition is part of the Contract #3- Mechanical and Fire Protection Contract.
8	Drawing M501, Detail 1 mentions drain pans and leak detectors, yet the detail doesn't include this. Please clarify if and where the drain pans are required.	Overflow pan and water sensor are required for AC-1 unit only. Refer to updated Drawing M501, included with this Addendum.
9	On Contract Drawing F0301, cross section 101 contains the note "SOE/Soil Retention by others." Please advise if steel sheet piling is done by others or by the General Contractor for Contract #1.	SOE/Soil Retention is part of Contract #1- General Contractor. Refer to updated Drawing F0301, included with this Addendum.

10	TAG#0.07 HMD/HMF – door type D – 6'0"x6'10"x1-3/4", HW/SET# 4A. D type is Pocket door, HW/SET# 4A is for swing door with hinges. Please advise how to proceed.	Door #0.07 is door type A (not D). Refer to updated Door Schedule on A860, included with this Addendum.
11	Where on the drawings are the blinds called out? I see the curtains on the cellar and third floor, but I don't see any blinds shown. Please advise.	Window shades are called out on 2/A101M, 2/A102, 2/A103, 2/A104, as well as on Detail 3/A521.
12	The RFP indicates the subcontractor limit to be 60%. We respectfully request that the subcontractor limit be increased to 75%.	For Contract#1- General Contractor, the subcontractor limit of 60% subcontracted work will be maintained.

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Adams Rite Exit devices do you want 628 aluminum finish or US32D? In the part number 8611, 8801 & 8301 the "1" stands for the 628 finishes but also list US32D. Also, the 8933 is for a black finish but you also have US32D list.	Refer to updated specification section 087100 Door Hardware, included with this Addendum, for this clarification.
2	When you use the 8801 for example the 01 stands for 628 finish and then you have US32D listed which are 2 different finishes. If you look at the second column you see if you pick 01 you will get 628 or if you pick 03 you will get Black.	Refer to updated specification section 087100 Door Hardware, included with this Addendum, for this clarification.
3	If you need the US32D the second column you need to choose 00 which labeled as a US finish which is what a US32D is.	Refer to updated specification section 087100 Door Hardware, included with this Addendum, for this clarification.
4	Also, you have the 8000 series, but they are not fire rated and as shown in some of the Hardware sets. You would need the 3000 series – Please advise.	For fire rated doors, 3000 series to be used instead of 8000 series. Refer to updated specification section 087100 Door Hardware, included with this Addendum.
5	These specs and details are calling for an APP torch grade roof system. We cannot torch on wooden decks in the city. Please advise.	Per R3508-01(j)(2)(F), torch down roofing is not permitted on the roof of the building with a combustible roof deck assembly. 07 52 13 Atactic-Polypropylene-Modified Bituminous Membrane Roofing will be replaced with 07 52 00 Modified Bituminous Membrane Roofing with a cold adhesive application method. Roof details on A570.00 do not indicate application method, refer to 07 52 00 for application method information. Note that drawings correctly indicate a Modified Bituminous Membrane Roof.
6	For Toilet Accessories (10 28 13), would SLIMdri hand dryers be considered a comparable product with Turbo-Tuff Recessed High Speed Hand Dryer?	SLIMdri is not acceptable. To maintain ADA clearances in the tight bathrooms, recessed hand dryers are required.

7	Drawing 1/A300 - Repair, re-point & clean existing brick, 10% of the total facade. a. What type of repair? b. What cleaning process is required?	a. Restore as necessary to match the adjacent existing area. Test type of restoration for commissioner approval prior to proceeding. Restoration may involve replacement of individual or groups of damaged bricks and/or repointing where required. b. Use cleaning process/method that will allow for newly cleaned area to match the adjacent existing brick area. Test process/method for commissioner approval prior to proceeding.
8	Drawing A300 - North elevation- shows the stair bulkhead X4 and elevator control and parapet X3 (CMU 6") and Drawing A105 details 1 roof plan- shows X1 for the stair bulkhead, X4 for the elevator control. a. Should we assume bulkhead X1, elevator control X3, and parapet X1?	See revised drawing sheets A300.00 and A855.00, included with this Addendum. Exterior wall types are to be: parapet X3A (new wall type), stair bulkhead X1, and elevator control room: X4.
9	Drawing A301- East elevation- shows the stair bulkhead wall X3 and Drawing A105 detail 1 shows X2. a. Should we assume X3 on the exposed and X2 when abutting the next building? Please provide revised wall type and details.	Correct: X3 when the exterior is exposed and X2 when it is blindside installation.
10	North elevation- Emseal Expansion joint/filler a. Should this include the west side too?	Drawings 1/A300.00 South Elevation and 2/A300.00 North Elevation note for expansion joint filler to be used on both, East and West sides, of building.
11	Do we provide the price for Shoring?	Price for shoring must be included as part of the bidder's lump sum bid price.
12	We need drawings and details for Shoring.	SOE/shoring is means and methods and is the responsibility of the contractor. Contractor to provide drawing and details as a submittal for review.
13	Can we provide Allowance for Shoring?	Shoring will not be payable via an allowance. Bidders are required to include the price for shoring as part of their lump sum bid price.
14	It is not clear what areas, if any, require fireproofing. Please advise.	See Building Code Summary / Table 3-4 in Code Compliance Notes on sheet G004.00 for reference. Fire protection requirements are listed here for all building elements.
15	The project manual talks about solar and blackout shades, could you please tell me which shades are solar and which are blackout, or are they double shades?	Shades are either solar or black-out. No double shades. See re-issued sheet A880.00, included with this Addendum, for clarification.

16	It also says manual shades and motorized shades, could you please tell me which are motorized, and which are manual?	All shades are manual. See re-issued sheet A880.00, included with this Addendum, for clarification.
17	EIFS which is specified on the drawings / specs is no longer acceptable by NYC building department as they have banned all systems which has EPS or XPS insulation starting 2023 and only allowing. EIFS with Mineral wool insulation.	EIFS is acceptable if the foam plastic insulation is separated from the interior of the building and not used with Type IV construction, per Section BC 1408 of the 2022 NYC Building Code.
18	I don't see any demountable partitions, however there is a spec section for them. If they are required where are they on the drawings?	Steel framed glazed partition systems are used at Alcove (302A) & Office (304). Refer to A103.00, A603.00, A860.00.
19	Can DDC provide the following drawings? They were not included in the Addendum #1 documentation. A860.00 Revised Door Schedule FO301.00 SOE/ Soil Retention.	These drawing sheets have been included in the Addendum 3 drawing set and noted as Addendum 3 revisions.

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

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: October 12, 2023; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: October 12, 2023; 2:30pm

PROJECT No. : **PV669-NPC**

TITLE: **Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical**

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	APPROVED BY: GENERAL COUNSEL
#1 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/29/2023	kh	KT 10/2/23

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

September 29, 2023

ADDENDUM No. # 1
FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85024B0006 – PV669-NPC
Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical

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 #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Would you please advise if the job is Prevailing Wage? I don't see the labor agreement in the documents.	Yes, this Contract will include Prevailing Wage rates and supplemental benefits to be paid in accordance with Labor law Section 220. Refer to Volume 2 for this information.
2	Would you provide the list of plan holders for this project?	Plan Holder List is included with this Addendum.
3	Documentation Schedule E "Separation of Trades" charts shows all controls wiring for general construction, plumbing and sprinkler systems are provided and installed under Contract#4 Electrical Contract. Please advise if this is correct and, if so, please provide all wiring schematics related for each system specified as per this schedule.	Control wiring to be installed under the contract the equipment is installed. Please see revised Schedule E, included with this Addendum.
4	Please advise how many office trailers will require temporary power.	One. Refer to Section 01 50 00 Temporary Facilities, Services and Controls of the DDC Standard General Conditions for Multiple Contract Projects.
5	Please advise if this project will use a PLA Agreement.	No, this project is not subject to the PLA.
6	Is a Fulltime Site Supervisor required for this project?	Per Local Law 81, construction superintendents are required to be present at the job site full time. Also note that as per Schedule A of the Addendum to the General Conditions, a dedicated, fulltime Project Safety Manager is not required.
7	Are there any MWBE requirements for this project?	Yes. MWBE goal is 8% Unspecified for Contract #4 - Electrical. Please see M/WBE Utilization Plan in the PASSPort Procurement M/WBE Contract Considerations Section.
8	Drawing E201 shows light fixture Type TL-1-EM, in the lighting Specification Section 265000-21. This Type TL is shown as NOT USED. Please advise us what light fixture should be used in place?	The light fixture noted as Type TL-1-EM in the Cellar in Foyer is supposed to be Type TK-2-EM. See revised sheet E201, included with this Addendum.
9	Drawing E201 shows Fire Alarm Smoke Detector symbols throughout the drawings. Please advise if this is a typo?	It is not a typo. Smoke Detectors are shown as reflected ceiling element. Smoke Detectors are part of Fire Alarm scope of work.

10	Drawing E201 at the Staircase A shows a light fixture symbol. Please advise what light fixtures type is that?	This is fixture TM-EM. See revised sheet E201, included with this Addendum.
11	Drawing E202 1st Floor Plan shows Circuit PLP-28 Lighting Zone Tag EX-1 and EX-3 feeding Type TXA according to drawing E401 Panel Schedule PLP-1 circuit#28 is labelled as Trap Primer not for these light fixtures, please advise the correct circuit for this fixture.	Correct Circuit Number for lighting tagged EX-1 and EX-3 in PLP-1 is 31 (lighting). See revised sheet E201, included with this Addendum.
12	Drawing E202 1st Floor Plan shows an item labelled (RAP). please advise what is this device for and it function?	Please disregard this symbol. It belongs to the FA system (Remote Annunciator Panel). See revised sheet E202, included with this Addendum.
13	Please advise if Panel CELI is considered to be the 5KV Battery Inverter as shown on drawing E301 located on the 2nd floor?	This is confirmed.
14	Are there any specs for the 5KV Battery Inverter shown on drawing E301?	Yes. Refer to Section 263323 “Central Battery Equipment” for clarification.
15	Please advise if MC Cable is allowed to be used in concealed areas such as above GWB Ceilings Wall Partitions, etc., since Plenum Rated Teflon cabling is allowed to be installed free air above hung ceilings?	MC Cables should only be used in continuous, concealed locations up to the device, fixture, or equipment. Exposed splice boxes are not acceptable.
16	Please advise of the estimate range for the Electrical Contract (#4).	DDC does not provide cost estimate ranges prior to Bid Opening.
17	Please advise if there is a specific bid bond form required to use.	The Bid Bond form can be found in the PASSPort Questionnaire, Paper Bid Submissions section. Select the bid bond option for the Bid Security question and then it will appear.
18	Who is responsible for furnishing and installing the Theater Rigging Pipe Grid?	This scope is part of Contract #1 - General Construction.
19	Who is the building Fire Alarm vendor?	The existing building doesn’t have FA, hence no vendor.
20	Is the Electrician responsible for furnishing the lighting fixtures and controls package?	Yes.
21	Who is furnishing and installing the Video Display Backbox (7-55.1 & 7-55.2) on the AV drawings?	Both items are noted as CFIO (Contractor furnished, installed by Others), meaning that furnishing the items is part of Contract #4 (Electrical, Fire Alarm & Sounds System) and installation will be by Others. See TA604.00 for reference.

22	Regarding the low voltage systems (AV, Telecom, Security), is the Electrician responsible for furnishing and installing the system? Or are we only providing conduit pathways and backboxes?	Low voltage system/wiring is part of Contract #4 (Electrical, Fire Alarm & Sounds System). Please also refer to General Electrical Requirements 01 35 06.
23	Drawing E105 Roof Electrical Plan Notes 1 & 2 state to 'Provide Unfused Combination Starter Disconnects with Proof of Flow Current Status, Two Auxiliary Sets of Contacts and Firemen's Override Contact for RTU-1,2,3,4 and Fan SPF-1, TX-1,2 and ACC-1,2 Units.' However, Drawing M401 states the same notes related to all mechanical units. Please clarify if this is under the Mechanical Contract (#3) or the Electrical Contract (#4).	Devices are to be provided under Contract #3 - Mechanical. Installation and wiring of the devices under Contract #4 - Electrical.

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revised Volume 3:

Addendum to the General Conditions:
Schedule E Control wiring provider change.

Revised Drawings:

Part 2:
E201.00 Light fixture designation corrected.
E202.00 Lighting zone circuit corrected.

Plan Holders List: is included with this Addendum

VENDOR	EMAIL	TELEPHONE
A TECH ELECTRIC ENTERPRISES INC.	ali@atechelectric.com	(516) 595-7934
APPROVED GENERAL CONTRACTING INC.	info@approvedgc.com	(646) 706-3564
BH VAC INC	bh@bhvac.net	(347) 644-1040
COMMUNITY ELECTRIC INC	commelec@verizon.net	(718) 720-4188
FRATELLO CONSTRUCTION CORP	gc@fratelloconstruction.com	(631) 414-7171
HELLMAN ELECTRIC LLC	slazzaro@hellmanelectric.com	(718) 931-9900
INTERPHASE ELECTRIC CORPORATION	elucey@interphaseele.com	(516) 256-5515
JAMES LEWIS ELECTRICAL CORP	olewis@jameslewiselectrical.com	(347) 365-3166
JSJ ELECTRICAL CONTRACTING LLC	jsjelectricalcontracting@gmail.com	(347) 665-2824
OGC ELECTRICAL CONTRACTOR INC	gadams@ogcelectric.com	(718) 915-9627
Unified Construction Services Unlimited LLC	Dewey@unifiedconstructionservices.com	(646) 217-9911
XBR Inc.	plambrakis@xbrinc.com	(718) 606-0072

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

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

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

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: October 18, 2023; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: October 18, 2023; 2:30pm

PROJECT No. : **PV669-NPC**

TITLE: **Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical**

			APPROVED BY:	
ADDENDA ISSUED	**NO. OF DWG**	**DATE**	**ARCHITECTURE/ ENGINEERING**	**GENERAL COUNSEL**
#1 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/29/2023		
#2 Revised Bid Opening Date		10/11/2023	SZ	NA

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

October 11, 2023

ADDENDUM No. # 2
FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85024B0006 – PV669-NPC
Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical

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 October 11, 2023, at 2:30 pm is rescheduled to October 18, 2023 at 2:30 pm.**

   Contract #1 – Electrical 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.

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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 CDT
Chief Engineer

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

NOT USED

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

NOT USED

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 2 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for October 12, 2023 at 2:30pm is rescheduled for October 18, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None

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

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: November 1, 2023; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: November 1, 2023; 2:30pm

PROJECT No. : **PV669-NPC**

TITLE: **Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical**

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/29/2023		
#2 Revised Bid Opening Date		10/11/2023		
#3 Revised Bid Opening Date		10/17/2023	SJ	NA

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

October 17, 2023

ADDENDUM No. # 3
FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85024B0006 – PV669-NPC
Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical

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 October 18, 2023, at 2:30 pm is rescheduled to November 1, 2023 at 2:30 pm.**

   Contract #1 – Electrical 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.

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 CDT
Chief Engineer

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

NOT USED

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

NOT USED

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 2 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for October 18, 2023 at 2:30pm is rescheduled for November 1, 2023 at 2:30pm.

Questionnaire Changes:

None

Item Grid Changes:

None

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

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: November 1, 2023; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: November 1, 2023; 2:30pm

PROJECT No. : **PV669-NPC**

TITLE: **Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical**

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/29/2023		
#2 Revised Bid Opening Date		10/11/2023		
#3 Revised Bid Opening Date		10/17/2023		
#4 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		10/18/2023	SZ	KT

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

October 18, 2023

ADDENDUM No. # 4
FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85024B0006 – PV669-NPC
Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical

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.

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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.

Sarah Zomick for
Richard Jones, PE CWI CDT
Chief Engineer

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Would you please advise if there is a bill of materials for AV?	No. The AV scope of work is as per the Drawings and Specifications. Please refer to Audiovisual Drawings TA001.00-TA805.00, as well as updated Specification section 274116, included with this Addendum.
2	I am wondering if a value engineered lighting package would be acceptable? We are quite proficient at studying lighting plans and helping to procure quality lighting solutions at a fair price. Additionally, would you like us to quote the lighting controls portion as well?	The lighting scope of work is as per the drawings and Specifications. Please refer to Electrical Drawings E201.00-E402.00, Theatrical Lighting Drawings TL110-TL240, and Division 26 of the Specifications.
3	Please advise if the bid due date can be extended as we are not able to receive AV quotes without the BOM/equipment list.	The Bid Opening date will not be extended and remains scheduled for November 1, 2023.
4	Please advise where the Audiovisual Systems Equipment List is located. It is mentioned in Specification section 274116.	This list is located in Section 012100 of the Specifications in Volume 3. Refer to updated Specification section 274116 Integrated Audio Video Systems and Equipment, included with this Addendum, for clarification.

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Revised Specifications:

27 41 16 Integrated Audio Video Systems and Equipment

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

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

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

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: November 1, 2023; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: November 1, 2023; 2:30pm

PROJECT No. : **PV669-NPC**

TITLE: **Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical**

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/29/2023		
#2 Revised Bid Opening Date		10/11/2023		
#3 Revised Bid Opening Date		10/17/2023		
#4 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		10/18/2023		
#4 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		10/30/2023	SZ	NA

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

October 30, 2023

ADDENDUM No. # 5
FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85024B0006 – PV669-NPC
Nuyorican Poets Café Renovation Rebid – Contract 4 Electrical

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. (Not Used)

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 CDT
Chief Engineer

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

NOT USED

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Notice to Bidders – COVID 19 R5: includes updated phone # for DDC Bid Room.

DDC PROJECT #: **PV669-NPC**

PROJECT NAME: **Nuyorican Poets Café Renovation**

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.

Questionnaire Changes:

None

Item Grid Changes:

None

FMS ID: **PV669-NPC**

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 and Required for:

CONTRACT NO. 1	**GENERAL CONSTRUCTION WORK**
CONTRACT NO. 2	**PLUMBING WORK**
CONTRACT NO. 3	**HVAC + FIRE PROTECTION WORK**
CONTRACT NO. 4	**ELECTRICAL WORK**

Nuyorican Poets Cafe Renovation Rebid

LOCATION: **236 East 3rd Street**
BOROUGH: **Manhattan, NY 10009**
CITY OF NEW YORK

Contractor

Dated _____ , 20 _____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20 _____